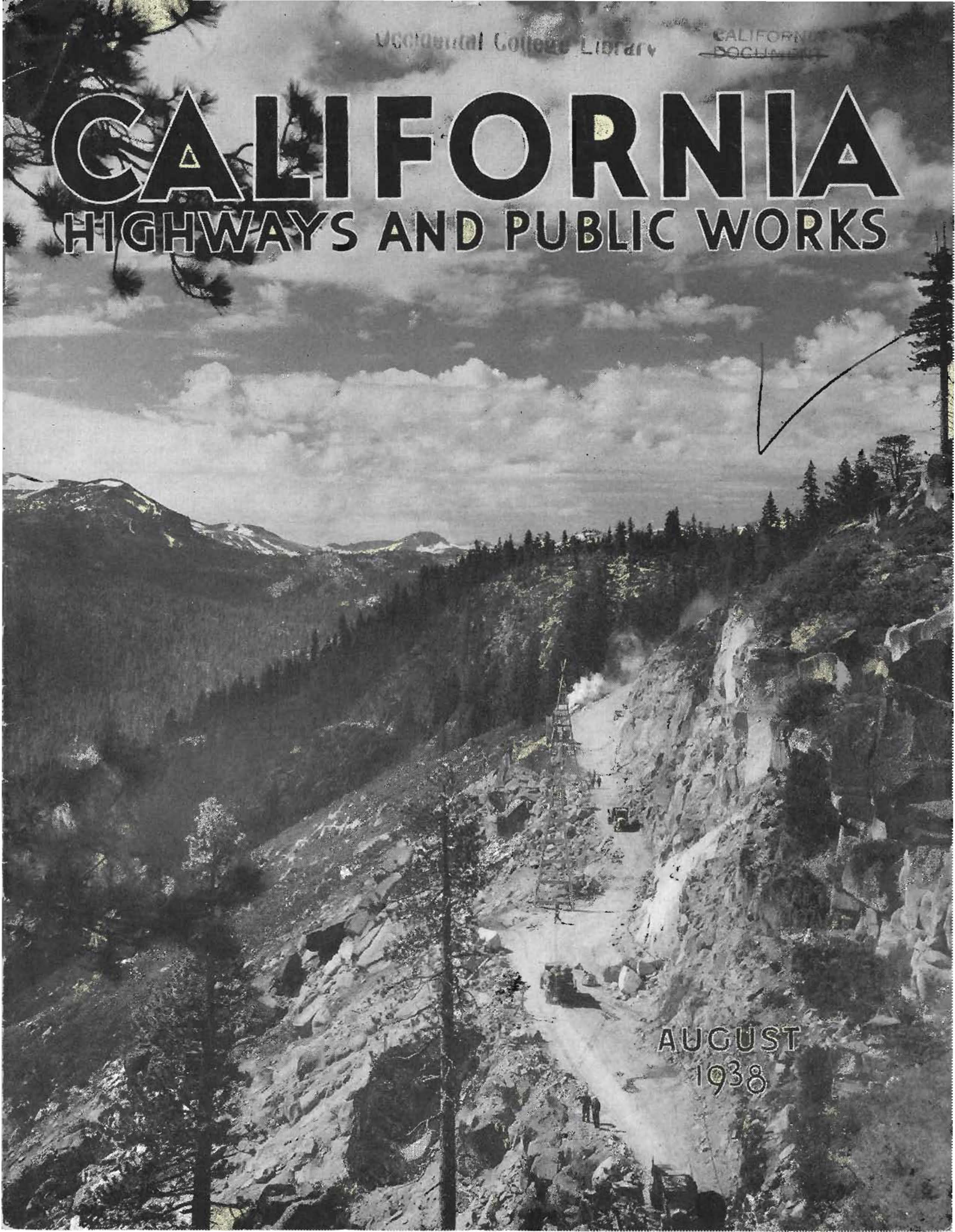


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HIGHWAYS AND PUBLIC WORKS



AUGUST
1938

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official Journal of the Division of Highways of the Department of Public Works, State of California

EARL LEE KELLY, Director C. H. PURCELL, State Highway Engineer JOHN W. HOWE, Editor K. C. ADAMS, Associate Editor

Published for information of the members of the department and the citizens of California

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Address communications to California Highways and Public Works, P. O. Box 1499, Sacramento, California.

Vol. 16

AUGUST, 1938

No. 8

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Placerville-Lake Tahoe Highway

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Funds Lacking for Requirements of 1300 Miles of State Highways and 377 Bridges in District III

THE rapid increase in the number and weight of motor vehicles; the recent doubling of the mileage in the State Highway System; the raising of standards of new State highway construction to provide additional safety at increased speed; the public demand for improved service, such as, expansion of snow removal service, traffic stripes, weed control, roadside planting, etc.; and the decrease in funds available for use on State highways because of the allocation of a portion of the funds to the cities for use on city streets have created a serious problem which is now confronting this department.

The effect of the decrease in finances for construction purposes in relation to the needs is made evident by many miles of highways and numerous bridges which are inadequate to serve traffic requirements properly.

To present a picture of the State's highway problem as it exists today, the District Engineers in each district in the highway system have been asked to report on the conditions and needs in their respective districts.

The following is a report by District Engineer Charles H. Whitmore of the situation as it exists in District III:

District III comprises the area occupied by eleven counties located in the southerly portion of the Sacramento River Valley and the mountainous section between the valley and the Nevada state line; namely, the counties of Butte, Colusa, El Dorado, Nevada, Placer, Glenn, Sacramento, Sierra, Sutter, Yolo, and Yuba.

The mileage of State highways in the district is approximately 1375 miles, of which 58 miles are within the limits of incorporated cities. This mileage is approximately 10 per cent of the total in the State Highway System.

The topography of District III is such that we have valley, foothill, and mountain roads. Climatic conditions vary from extreme heat in the valley to extreme cold and snow in the mountain areas.

The status of improvement of the roads in the district, exclusive of bridge decks and city streets, is:

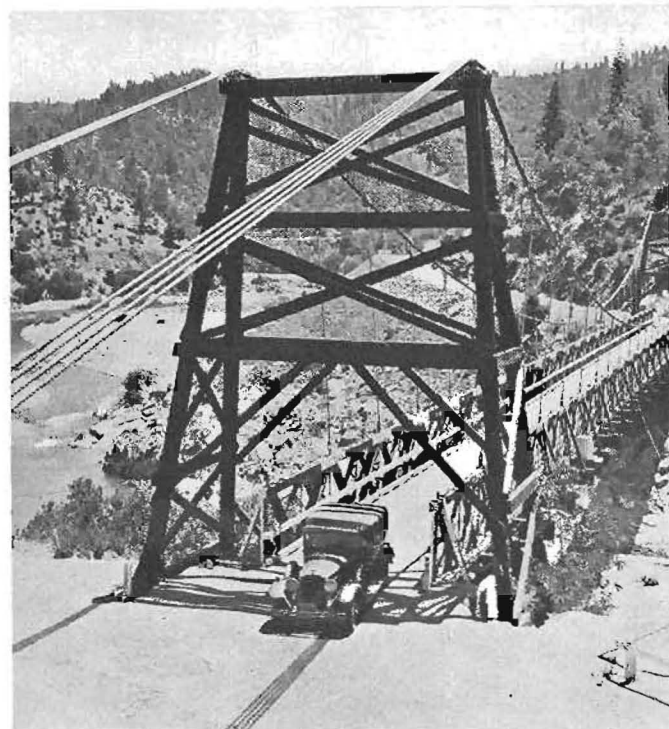
- 26 miles, or 2%, unimproved and unoled earth roads.
- 13 miles, or 1%, unimproved and unoled gravel roads.
- 130 miles, or 10%, oiled earth roads inferior as to grade, alignment, and width.
- 195 miles, or 15%, graveled roads with oiled surface.
- 520 miles, or 40%, intermediate type of surface.
- 416 miles, or 32%, high type pavement.

There are 377 bridges in the district with a total length of 50,700 lineal feet, or 9.6 miles. Nine of these bridges are of movable span type over the Sacramento River and seven of them require operators on duty at all times. The operation and maintenance cost of the movable span type is approximately \$4,000 a year for each of the seven operated bridges, or \$28,000 a year.

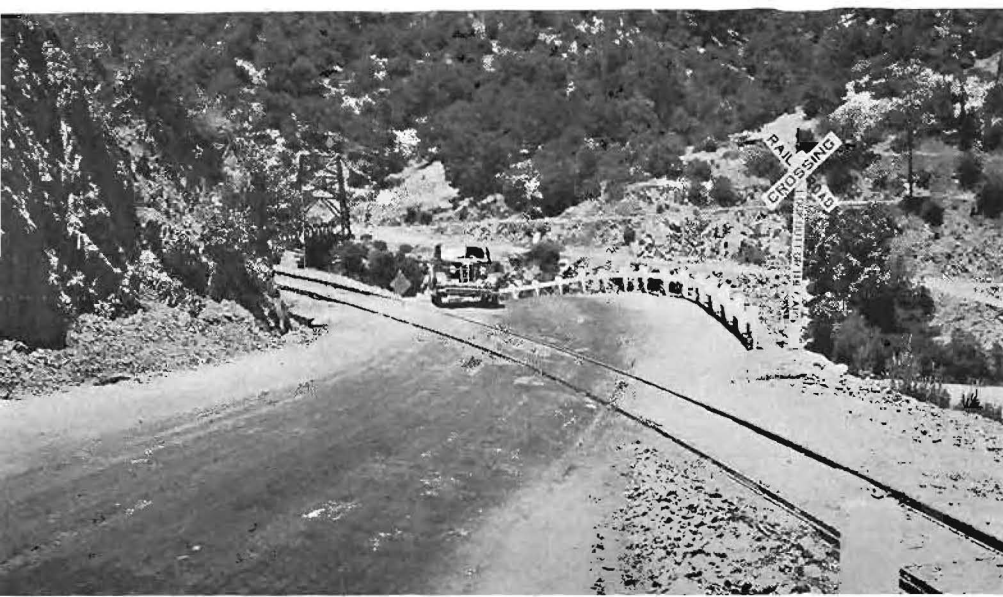
There are 142 railroad grade crossings and 45 grade separation structures in the district. Many of the grade crossings, on important routes are extremely hazardous and should be eliminated. Little progress has been made in eliminating grade crossings in this district in the last few years. Only one Federal grade separation project has been allotted to this district, construction on which is expected to start soon.

Construction Work Held Up

By Charles H. Whitmore
District Engineer, District III



Obsolete one-way suspension bridge on the Mother Lode highway in Placer County. (Below) "Road of a Thousand Curves" on Nevada City-Downieville Route in Nevada County.



Top—Steep approach on curve to rail-road grade crossing on Placer County road. Center—Narrow bridge on sharp curve alignment creates hazardous driving conditions on this Nevada County highway. Bottom—Narrow bridge between Marysville and Yuba City with restricted speed for loads over 10 tons occasions many traffic jams.



We have six State highway routes crossing the Sacramento River and adjacent low lands. Five of these routes contain sections which are submerged during flood periods most every winter, and traffic is stopped entirely or is required to pass, subject to traffic control, through water for distances varying from a few hundred feet to a mile or more.

The route entering Sacramento from the north is subject to overflow at the American River, and flood gates are operated to prevent water from flooding North Sacramento. When these gates are closed it is necessary to detour all traffic over unsatisfactory roads. The route leading from Sacramento to Amador County is subject to overflow at the Cosumnes River.

Snow removal is required during normal years on 415 miles or 30 per cent of the highways in the district. The average yearly cost of this work is about \$110,000, or approximately \$220 a mile. During the past winter we had a total snowfall at Donner Summit of approximately 600 inches, or 50 feet. Our cost of snow removal was approximately \$170,000, or \$400 a mile.



By adding the average cost of snow removal and maintenance and operation of movable span bridges we find that we have a yearly maintenance cost of approximately \$138,000, or \$110 a mile for all roads in the district which we are obligated to expend for service, none of which may be considered as expenditure for the maintenance of the surface or roadside of the 1300 miles of roads in the district. Most of the other districts do not have as many movable span bridges or as extensive snow removal operations, and a greater proportion of the funds allotted to them may be expended for repair of roads, surfacing, and roadside improvement than is possible in District III.

All the earth, gravel, and oiled earth and gravel roads are inferior as to grade, alignment, and width.

Top—This narrow, obsolete type subway with a sharp curve approach is a driving hazard near Roseville on U. S. 99-E. Center—A narrow bridge with short sight distance makes careful driving necessary on this section of U. S. 99-W in Yolo County. Bottom—Blind vertical curve to narrow bridge on Placer County highway.



They should be improved with construction funds in order to serve traffic properly.

Of the intermediate type roads 90 per cent needs new construction or reconstruction in order to provide satisfactory alignment, grade, and roadway width for existing traffic.

Our report of status shows 416 miles, or 32 per cent, of the roads in the district as high type pavement. The recording of that fact without explaining would be misleading. There are approximately 400 miles of highway in the district which has been surfaced with Portland cement concrete or asphaltic concrete; however, approximately 280 miles, or 70 per cent, of the 400 miles listed is old pavement only 4 and 5 inches in thickness, 12 and 15 feet wide, on poor alignment, blind vertical curves and excessive grades, and was constructed from 15 to 20 years ago. The old pavements have been made usable by widening with intermediate type surfacing to a 20-foot width and placing thin bituminous retreads or blankets on the surface. Heavy loads, high speed, and pavement deterioration have brought many miles to a state of near collapse.



Bridge construction in the district is not keeping up with requirements. Based upon bridge deck areas 66 per cent of the bridges are obsolete and entirely inadequate to serve traffic demands properly. Narrow bridges with restricted sight distances are prevalent on main routes of travel.

It is estimated that to put the roads and bridges in the district in condition to serve present traffic condition would require:

| | |
|----------------------------|-----------------|
| 537 miles new construction | —\$21,800,000 |
| 590 miles reconstruction | ---- 14,700,000 |
| 50,700 lin. ft. bridges | ----- 7,500,000 |

Total required -----\$44,000,000

A review of the district's expenditures for the past nine years shows construction expenditures varying from a low of \$539,300 to a high of



(Continued on page 20)



Partially completed highway relocation on east side of Echo Summit. Meyers in center right and Lake Tahoe in distance.

Realigning Tahoe Highway Grade

IN THE Sierra mountain region of El Dorado County there is under construction a grading contract of a short but important unit on U. S. Route 50. It is a relocation of the road over Echo Summit and includes the upper part of Meyers Grade, on the Placerville-Lake Tahoe Highway.

The revised highway departs from the existing road two miles east of Phillips Station, trending southeasterly on easy grade through timbered land to a small pass in the ridge east of the existing highway summit, at a site where the old Hawley Grade wagon road passed. This road was built in 1858 to provide a shorter route to the gold country and was used till 1861.

From the Hawley Grade crossing the current construction descends on not to exceed 5.6 per cent grade to a point on the present Meyers Grade below the switchbacks. It will eliminate the present switchbacks, poor curvature, and the steep grades of 11 per cent and over on the super-seded stretch. Eventually the relo-

cation will be extended to modernize the entire length of Meyers Grade to the lake valley.

The construction of this 2.3 mile unit is undertaken as a National Forest Highway Project, financed from Forest Highway Funds. The location was established by surveys of the State Division of Highways with final plans completed by the U. S. Bureau of Public Roads, under whose jurisdiction the contract is conducted. The construction will approximate an expenditure of \$303,000.

West of the summit no difficult construction is involved in obtaining excellent roadway standards. From the summit to the easterly end of the contract, one mile, the work passes through irregular rock bluffs that top the steep slopes high above the valley floor. On this mile the design and construction of a roadway for a 24-foot crown width of surface present a difficult problem. Solid benching, retaining walls and concrete bridging were the practical means of providing roadway. At only several places

would fills hold and in these places but to limit extent.

The desire to keep construction scars to the minimum on this recreational route influenced design and affected construction methods. Cabins and lodges along the brink of the crest above the highway location increased difficulties. Careful attention is being given to landscaping. The contractors are Louis Biasotti & Son and John Rocca.

Although completion of the contract is not expected until the fall of 1938, the present status of the job shows excellent results. As construction operations proceeded, the excavation lines in the high cutting of the fractured rock formation east of the summit have in general held unusually close to neat cross-section, avoiding excessive overbreak and resultant waste scars.

Careful engineering and construction work are evidenced. Cement rubble masonry walls maintain support for much of the roadway in critical stretches, with design of these

(Continued on page 6)



On sheer eastern cliffs of Echo Summit power shovel is making final cut for Meyers grade relocation. Lake Tahoe in distance.



View of new construction on Echo Summit looking south toward Luther Pass. Arrows indicate portions of old Hawley Grade.

features well in keeping with the character of the country traversed.

The new construction will be a spectacular section of the Tahoe Highway. Coming from the west the motorist will pass from an avenue of virgin timber to a vista overlooking the panorama of the Lake Tahoe basin. The transition will be made over a sweeping summit curve, widened and safeguarded.

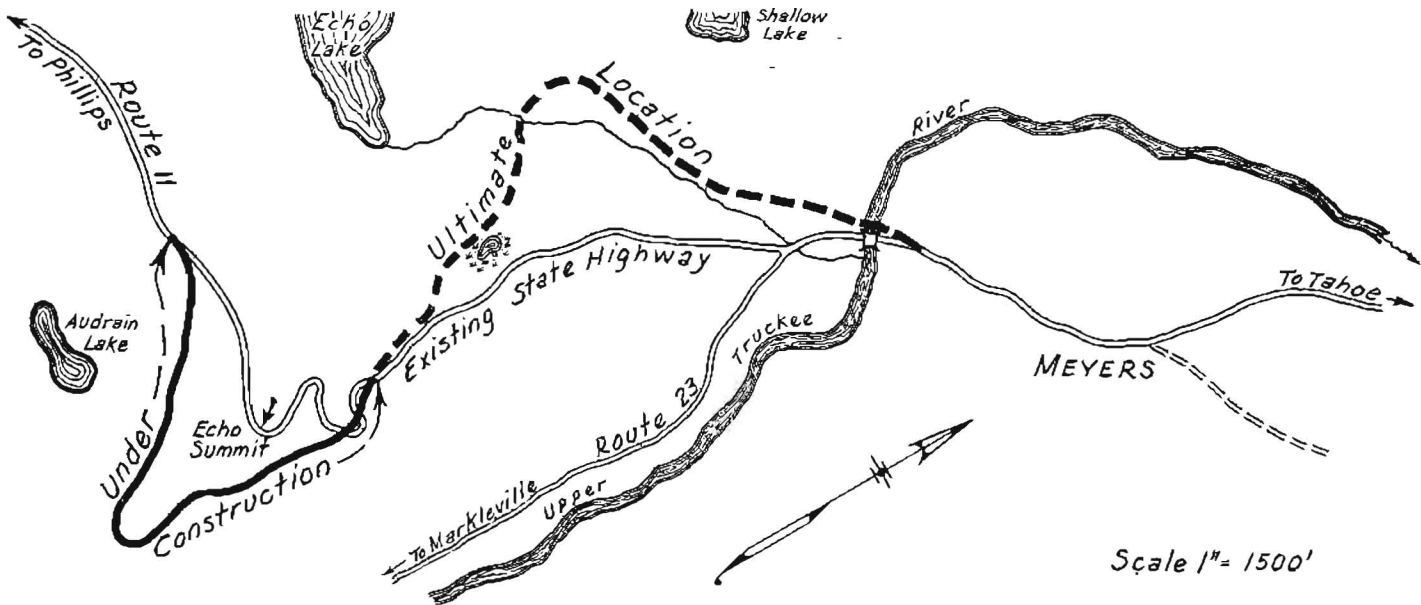
The descent that follows will be on

a roadway where width, curvature, grade and sense of security will be in marked contrast to the present road. The new road will facilitate maintenance, especially in providing reasonably safe conditions when snow removal is required to keep the route open. Similar road standards will apply when the entire grade can be reconstructed to Meyers.

Surface treatment is not included in the current contract. Provision

for this item will be made by the State.

The U. S. Bureau of Roads officials in charge of the project are: L. I. Hewes, Deputy Chief Engineer; C. H. Sweetser, District Engineer; Levant Brown, Senior Highway Engineer, in charge of Forest and Park roads construction; E. C. Brown, Senior Highway Engineer, as Supervising Engineer, and M. M. Flint, Resident Engineer.



Map shows how relocated route will eliminate switchbacks below Echo Summit on existing Meyers Grade of Tahoe Highway.

Highway Commission Head Urges Necessity of Protecting Gas Tax

By H. R. JUDAH, Chairman, California Highway Commission

CALIFORNIANS generally are zealous of the value and importance of gasoline tax revenues. They know now from years of experience in the paying of the four cents per gallon excise at the pump, that there has been created for their enjoyment and profit out of these revenues one of the finest systems of highways the world has ever seen, with its completion and perfection still a long way off.

There is no question but what the gasoline tax in this State is the most popular form of taxation yet devised and for a use that is equally popular—the building of primary and secondary highways and bridges and the reconstruction and maintenance of the State system in all of its component parts.

For the purpose of safeguarding this splendid system of financing to bring about the ultimate perfection of a well coordinated highway system throughout this great State, the people will go to the polls in November and vote on a proposed constitutional amendment which will provide once and for all that "all moneys collected from any tax now or hereafter imposed by the State upon the manufacture, sale, distribution or use of motor vehicle fuel, for use in motor vehicles upon the public streets and highways over and above the costs of collections, and any refunds authorized by law, shall be used exclusively and directly for highway purposes."

FAVORED BY ADMINISTRATION

This proposed amendment, which has the support of the present State administration from our highway-minded Governor, Frank F. Merriam, down to the lowliest official or worker in the Department of Public Works and the Division of Highways, is presented in such a way that all legal necessities for its conformation to existing statutes and constitutional provisions, have been provided for.

Under the important provisions of the new amendment is the adherence to the present requirement in the statutes which calls for the expenditure of not more than twenty per cent of one cent per gallon tax on motor vehicle fuel by the legislature for the payment, redemption, discharge, purchase, adjustment, contribution to or refunding of special assessments or bonds or coupons issued for streets or highway purposes and which special assessment districts were initiated by an ordinance or resolution of intention adopted prior to January 1, 1933.

Other provisions of the new constitutional amendment freeze into the State's basic law all of the other well-known stipulations of present day statutes which allow the payment from gasoline tax funds (in the event such use will not in any manner cause the loss of Federal

highway funds to the State), of moneys for the discharge and payment of bonds voted at an election prior to January 1, 1935, and issued by a city and county, or county, the proceeds of which have been used exclusively and directly for highway purposes.

STATUTE PROVISIONS PROTECTED

The new amendment provides for temporary loans of gasoline tax income to the State general fund, but specifically requires the return of the money into the original fund for highway purposes. The new amendment also protects section 15 of Article 13 of the State Constitution reading as follows:

"Out of the revenues from State taxes for which provision is made in this article, together with all other State revenues, there shall first be set apart the moneys to be applied by the State to the support of the Public School System and the State University."

It is provided, however, in the matter of loans to the general fund for other purposes, apart from schools, that the moneys so transferred from gasoline tax revenues shall be returned from the first money available in the general fund in excess of those required for the support of the schools and the State University.

PREVENTS ADVERSE LEGISLATION

The extreme importance of a favorable vote by the people in November on the new constitutional amendment may be emphasized by two main reasons. First, unless the use of gasoline tax money for highway purposes is made compulsory by constitutional enactment, the danger of legislative diversion of gasoline tax money to other projects not related to the construction and maintenance of a highway system, will still prevail; and diversion of this money in the future even in the

(Continued on page 25)

4,241,000 Trucks on U. S. Highways

More motor trucks are operating on the highways today than in any period since the beginning of the industry. There are 4,241,000 trucks in the service of farmers, industrial shippers, common and contract carriers, railroads and steamship lines.

Wholesale value of production last year amounted to \$545,000,000 or 13 per cent higher than the former record year of 1936.

More than 3,100,000 drivers now are employed in moving commodities over the highways in commercial vehicles. This represents an increase of 5 per cent over the number of persons employed in this capacity during 1936.—*Motor Transportation.*



This accident occurred in day time on paved highway with good sight distance and best driving conditions prevailing in every respect.

Photo Courtesy California Highway Patrolman

Relation of Scientific Engineering

The following article is the first part of a paper on "The Relation of Scientific Engineering to Accident Prevention" prepared and presented by J. W. Vickrey, Safety Engineer of the Division of Highways at the Institute of Government held at the University of Southern California in Los Angeles, June 14, 1938. A second installment will appear in a later issue of this magazine.

By J. W. VICKREY, Safety Engineer, Division of Highways

THE whole subject of Accident Prevention comprises so very many elements, each blending into the other, that no clear-cut lines of demarcation exist. And to add to the confusion, the term "Engineering" is daily being used to cover almost every phase of human endeavor and may also, in fact, be accepted as both an art and a science.

It is, of course, to be understood that the accidents under consideration are motor vehicle traffic accidents. Two quite distinct branches of engineering are most directly concerned, the one dealing with the machine itself and the other with the roadway and its various functions. Whatever we may have to say will be

restricted to the latter, and primarily to the rural portion of our highway system.

Gano Dunn defines engineering as "the art of economic application of science to the purposes of man." I make no pretense toward qualifying as a scientist. I do, however, subscribe very definitely to the value of a scientific approach toward the problem of accident prevention. This means the use of known and measurable data in a logical course of reasoning to establish an accurate relationship between cause and effect.

FACTUAL DATA IMPERATIVE

If we are to deal intelligently with accident prevention, we must have

all the factual data that it is possible to obtain regarding accident occurrence—a simple, trite statement, perhaps, and yet one that can not be too strongly emphasized—for it is doubtful if there is any other popularly discussed subject, unless it be economics, about which so much is known that isn't so.

The fundamental relationship which scientific engineering bears toward accident prevention can not be different from that which engineering bears toward any other problem. It differs from pure science in that it is essentially practical and is bound up with economics. A. M. Wellington, well known engineer of the last generation, put it in this way: "To

define engineering rudely, it is the art of doing well with one dollar what any bungler can do with two after a fashion."

The first and foremost need, then, in establishing this relationship of scientific engineering to accident prevention, is for the assembly and analysis of observed facts regarding accident occurrence.

HUMAN ELEMENT UNRELIABLE

The laws of physics are well established and are as a matter of course incorporated in all engineering design. Highways so designed would function perfectly for robot-controlled machines of corresponding design. The laws of human behavior are not so well established, and the machines are driven by you and me and millions of others like us. That we are so alike in a great many of our actions and reactions, provides the basis for hope that highways may be so designed that the chief hazards of accidents will be eliminated.

Individual opinion as to what motorists will do, or even as to what they actually do, is highly unreliable. Factual records so very often show

little regard for preconceived notions regarding such things. The need for accurate data being admitted, it follows that both in their assembly and in their later use there must be direction by minds trained to think in terms of scientific engineering—not merely technical experts but those who quite frankly question the truth and value of statements or ideas that can not be, or at least have not yet been, demonstrated.

EXHAUSTIVE ANALYSIS DEMANDED

Accidents do not result from a single cause. This is true not only of the mass but of the individual cases. They each and all result from combinations of circumstance, some comparatively simple and many very complex. Any satisfactory analysis must be so made as to take into account as many as possible of these combinations. Analysis on any other basis is scarcely worth the effort.

Complete and accurate assembly of all pertinent facts, proper marshalling of these facts for review, and exhaustive analysis of recorded combinations: this is the procedure demanded if we are to successfully cope

with the problem of accident prevention.

I have pointed out that engineering is "the economic application of science." No matter what freedom may be exercised by other professions, the engineer can not ignore economics.

It is this compelling circumstance that makes necessary an accurate analysis of the whole situation. He must first determine those things that contribute toward those types of accident over which some control is probable or possible through engineering effort. There must then be an arrangement in order of importance as judged by number, severity of consequences, et cetera. Unlimited funds are never available and a choice must be made as to how and where those that are available shall be spent. This is at once the duty and responsibility of the engineer. Final decision may rest with others but this does not relieve him of the obligation to make definite recommendation.

Adequate, satisfactory facilities for the movement of persons and goods by motor vehicle, these are the things

(Continued on page 18)

to Accident Prevention

Too much speed and reckless driving were the attributed causes for a head-on collision of truck and passenger car on a good straight highway.

Photo Courtesy
California Highway
Patrolman





Recently completed section of route to Pinnacles National Monument in San Benito County. Bolado Park on right.

New Pinnacles Highway Opened

By EDWARD J. NERON, Deputy Director of Public Works

THE completion and dedication of another section of State Highway Route 119, covering that portion lying between Tres Pinos and Paicines in San Benito County, occurred on Sunday, July 24th. This section of highway, known locally and advertised as the "Pinnacles Route," connects Hollister, the county seat of San Benito County, with the Pinnacles National Monument.

The formal dedication was held at the northerly end of the recently completed contract, which is at the southerly limits of Tres Pinos. The ceremonies at this point were brief and consisted of short talks by H. R. Judah, Chairman of the California Highway Commission, and Deputy Director Edward J. Neron representing Governor Frank F. Merriam and Director Earl Lee Kelly of the Department of Public Works. Cutting of the ribbon and the breaking

of a bottle of wine of local vintage by Mr. Neron inaugurated the opening of the highway.

Following the opening ceremonies an automobile procession formed and proceeded over a portion of the new highway to Bolado Park, a beautiful San Benito County recreation spot where a barbecue luncheon was served to the many guests of San Benito County in a large pavilion.

Public appreciation of San Benito County citizens for the improvement by the State of this road to the National Monument was evidenced by the very large assemblage at the dedication and barbecue. An actual count showed more than 2000 people present at the fete which was handled with the utmost efficiency.

J. M. (Jake) Leonard, State Assemblyman for San Benito and Santa Cruz counties, who acted as Master of Ceremonies, introduced many

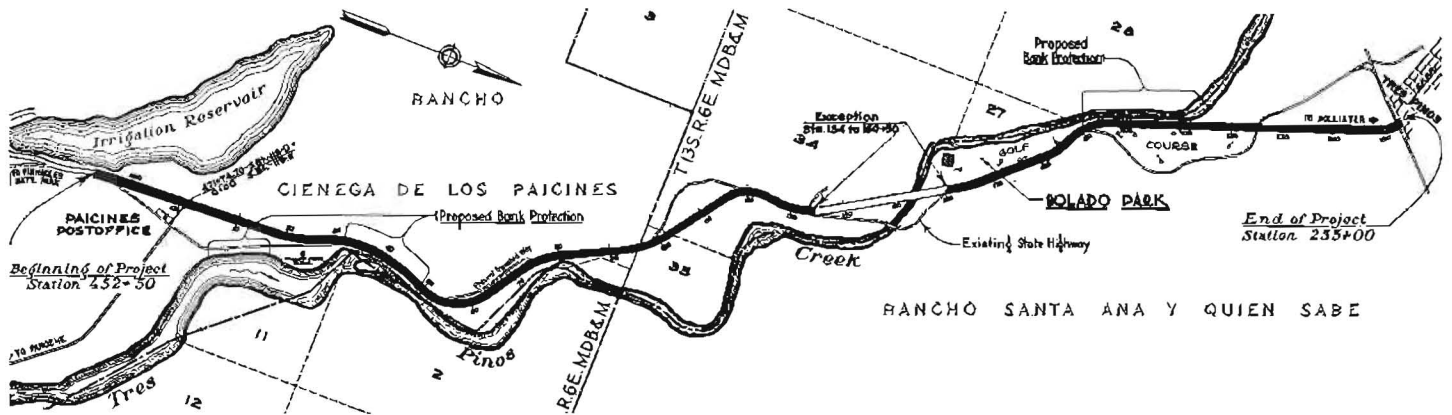
visiting guests and called on various public officials for speeches.

The following County, State and Federal officials were introduced and spoke: J. F. Etcheverry, San Benito County Supervisor; W. I. Hawkins, Custodian Pinnacles National Monument; Congressman John J. McGrath; Miss Tickle, representing State Senator Ed. Tickle of Monterey and San Benito counties; State Senator James B. Holohan of Santa Cruz County; Phillip A. Stanton, State Highway Commissioner; Mrs. E. M. Brown, formerly of State Park Commission; Timothy A. Reardon, Director of Industrial Relations; L. V. Campbell, Engineer of City and Cooperative Projects, Division of Highways; H. R. Judah, Chairman of Highway Commission; L. H. Gibson, District Engineer and L. E. McDougal, District Office Engineer of District V, and the writer.

(Continued on page 12)



View of another section of new highway between Paicines and Tres Pinos on route to Pinnacles National Monument.



Realignment between Tres Pinos and Paicines in San Benito County. Black line indicates new highway in comparison with old.

The persons who participated in the ribbon cutting ceremonies at the official opening of the new Pinnacles Route Highway shown in the group below are, left to right: Lizzell Faxon; Congressman John J. McGrath; L. V. Campbell, Engineer of City and Cooperative Projects; Edward J. Neron, Deputy Director of Public Works; J. W. Trask, Assistant Engineer of City and Cooperative Projects; Barbara Turner; H. R. Judah, Chairman California Highway Commission; Betty Williams and Philip Stanton, Member California Highway Commission.





Another new section of route through the hills to Pinnacles National Monument. Note pleasing appearance of rounded slopes.

The talks by the visiting members of the Department of Public Works seemed to be particularly interesting to the assembled citizenry and were greeted with much applause.

State Highway Route 119 referred to locally as the "Pinnacles Route" was taken over by the State from San Benito County in 1933. The major portion of the traffic using this route consists of visitors to the Pinnacles National Monument which is about 35 miles south of Hollister. This National Monument, includes several hundred acres, and has been a point of interest for years because of the very unusual rock formations including two clusters of towering rocks referred to specifically as the Pinnacles. This area was made a National Monument some years ago and has been under the custodianship of W. I. Hawkins most of that time. Mr. Hawkins has been instrumental in obtaining the expenditure of considerable sums of Federal money within that area in the construction of roads, camp grounds, etc., that are very well equipped to take care of visitors for any length of stay. The records show that a large number of tourists visit the park.

State Highway Route 119 extends from Gilroy on the Coast Highway (US 101) through the city of Hollister and up the San Benito River Valley and Lewis Creek to a junction in Priest Valley with the lateral road connecting the San Joaquin Valley by way of Coalinga to the

Coast Highway (US 101), a total distance of about 80 miles, most of which is in San Benito County.

The section dedicated is the second major construction project on this part of the road since it was taken into the State Highway System. In 1936 a portion of the road referred to locally as the Bear Valley Grade was reconstructed for a distance of 3.1 miles at a cost of approximately \$110,000. This contract eliminated the worst portion of the section between Hollister and the Pinnacles National Monument.

The newly completed project brought to a higher standard that portion of the old road which had been at various times made impassable by high water in Tres Pinos Creek. The southerly terminus of this project is in the vicinity of the community of Paicines which is located at the Junction of Panoche Valley Road, a part of the county highway system. From this point this route follows generally in a northerly direction more or less paralleling Tres Pinos Creek, passing close by Bolado Park, and has its northerly terminus at the southerly end of the town of Tres Pinos.

The total length between termini is 5.2 miles, but an exception to the contract about $\frac{1}{2}$ mile in length was made in the vicinity of the crossing of Tres Pinos Creek as funds were not available to build a new bridge at that location, so that the total improved mileage is 4.7 miles.

This section was graded to a width of 26 feet with surfacing of the road-mixed type 24 feet in width. The minimum radius curvature of 800 feet and the maximum gradient of 5.3 per cent with a total of only thirteen curves, briefly indicates the comparatively high standard of this new construction for a secondary highway. The alignment and grade is of modern standards and this new project shortens the distance between the above mentioned termini about one-half mile. N. M. Ball Sons of Albany were the Contractors on this section of road, having been the low bidder against 15 other Contractors. The State was represented on this work by Fred C. Weigel who acted as Resident Engineer.

As noted above, the old highway between the termini above mentioned, was frequently subject to damage during high water in Tres Pinos Creek and while the new alignment was so placed as to offer less hazard from such damage, it was anticipated that protection of some nature should be included to further safeguard this new construction before the coming winter. Accordingly, plans have been completed for sacked-concrete and brush fence protection. This was not made a portion of the grading and surfacing contract as it was decided to study the ravages of this stream during the high water period with relation to the new alignment.

New Traffic Survey Maps Show Homes, Schools, Gas Stations, Etc.

By T. H. DENNIS, Maintenance Engineer

IN MAY, 1936, the Division of Highways, cooperating with the Bureau of Public Roads, undertook a highway planning survey to establish facts essential in the selection of an integrated road system, and to indicate both the priority and the costs of improvement. Three studies were projected—a road inventory to take stock of the existing highway facilities, and traffic and financial studies to ascertain their use and cost. This article deals with the phase first commenced, the Road Inventory.

In July, 1936, twenty-four reconnaissance parties were sent into the field to log all roads that could be traversed, and to record their general condition—the type of surface and the main characteristics of roadbed, alignment, gradient, and drainage. Naturally, emphasis was upon public roads, and those of private ownership and use were excluded as far as possible. By the time logging was completed in May, 1937, the field parties had traveled 287,202 miles and had logged 86,924 miles of local roads in addition to the State highway.

QUESTION OF PRECISION

A word of caution is necessary as to the significance of this total of rural road mileage. To engineers, particularly, the exactitude with which it is stated is suspected on the grounds that men and machinery err; that survey distances differ from odometer readings (both have been used, although the latter predominate), and road mileage, too, is constantly changing. Obviously the precision with which the rural road mileage is indicated—and it is done solely as a matter of convenience in casting up the accounts—is impossible to attain. Deficiencies of this sort are minor when the broad aim of the survey is considered. Questioning the degree of refinement does, however, lead to two consequential qualifications that are less obvious.

First, it can not be said that all public roads are traversable by automobile. Often property is dedicated for a road and considered by some authorities to be such even though no traveled way is constructed. Again, there are many miles of road in the forests, which are closed during the fire season although they are quite capable of accommodating traffic. In making the road inventory, such cases were of necessity ignored.

ROADS NOBODY CLAIMS

Conversely, and still remembering that roads which are manifestly private are excluded, it is essential to note that all roads that can be traveled are not public roads. Reasonable investigation of 17,292 miles of the local roads fails to disclose any governmental unit sufficiently interested either to maintain or to claim them. They appear, nevertheless, to be public. Most of them are of low-type, but some are well improved and in either event motorists probably consider them as public roads.

Roads of this kind were included in the inventory for the sound reason that they are sources of rural traffic, and one of the necessities of the study was to note the existence of improvements that might affect the comings and goings of people. Thus, the locations of farms, dwellings, businesses, schools and similar gathering places were noted by the field parties, later to be plotted on maps.

In January, 1937, while the field work was still in progress, preparation of a base map of California was commenced. This base map consists of 303 sheets, of which 283 are on a scale of one inch to the mile, and 20 sheets on four times that scale. The latter sheets cover the thickly settled portion of Los Angeles County, southerly from the Sierra Madre to the Pacific Ocean, and westerly from the Orange County line to the

Santa Monica Mountains. Individual sheets are a yard square, and although two or three sheets suffice for a majority of the counties, thirty sheets are required for San Bernardino. This map, now 87 per cent complete, will be finished September 1.

WEALTH OF DETAIL

All maps have the common purpose of showing position, direction, and distance, but the treatment of culture features customarily varies widely. Some may emphasize property lines, others railroads, or gasoline service stations. The base map is no exception in this respect. Its chief characteristics are uniformity of treatment as to scale and conventions, and a wealth of cultural detail.

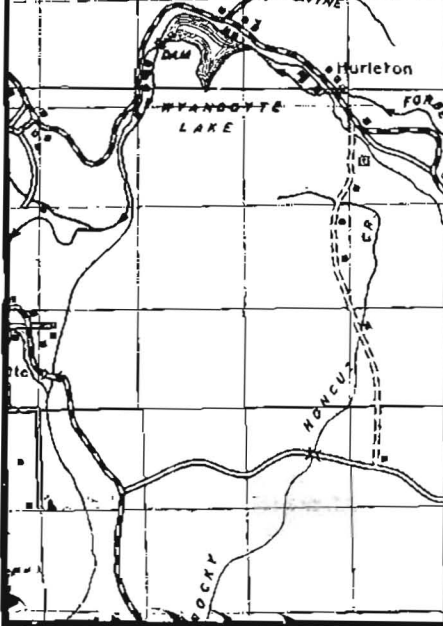
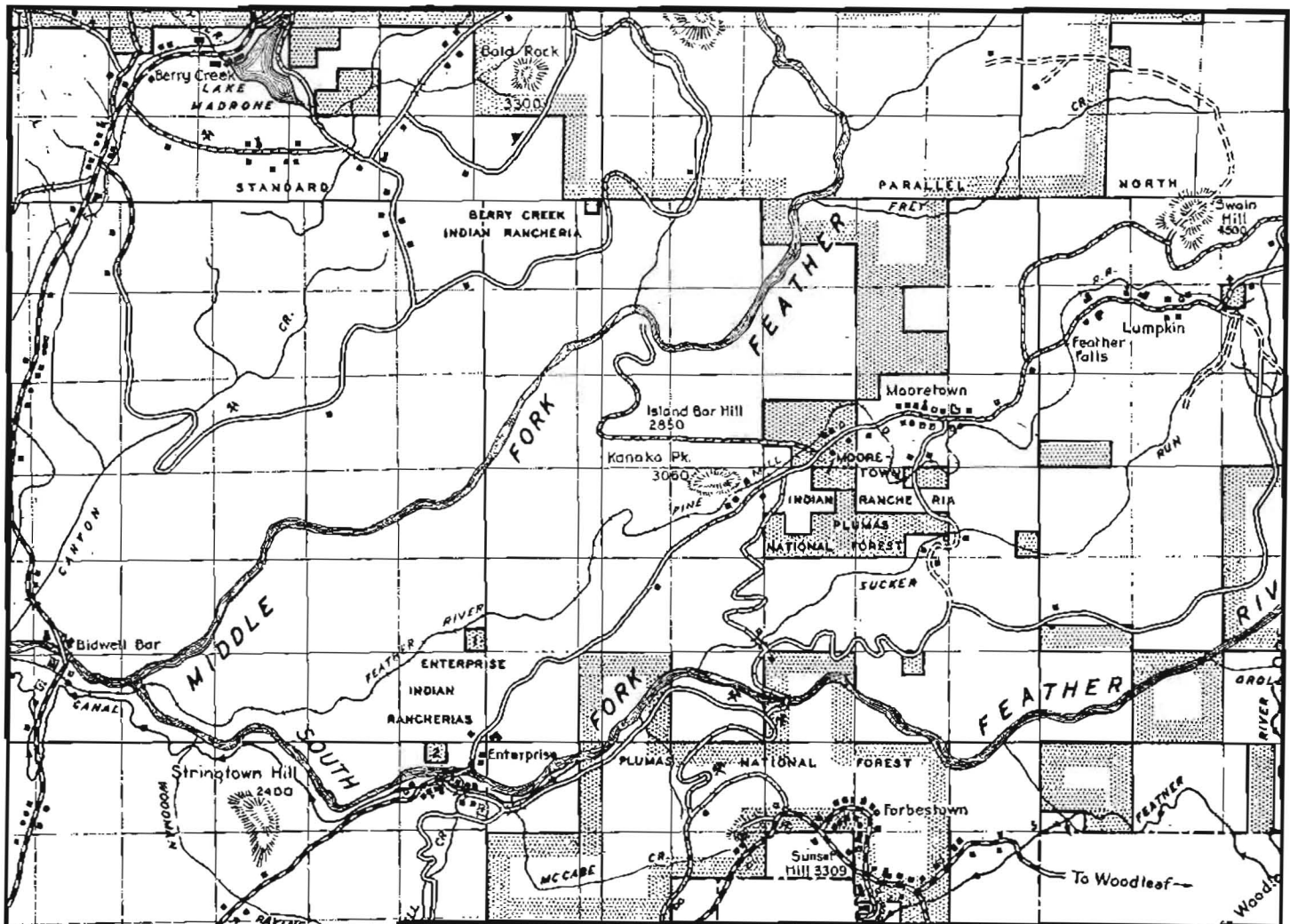
The farms and similar man-made improvements noted by the field parties have been traced and are distinguished from one another. Natural features are delineated sufficiently to indicate topography and drainage, yet these are not emphasized at the expense of culture for both are equally subservient to the main purpose which is to present naturally and logically the chief facts indicating the present road facilities and their use.

An additional attribute of the base map is that no legend is shown within the roadbands; thus, on copies of it, different legends are being used for a variety of purposes. The General Highway map, of which small portions of two sheets are shown on pages 14 and 15, presents the kinds of surfaces on the rural roads and their urban connections. This particular series will probably have the most general service of any of the series.

Three other series, identical except for the legends used in the roadbands, are designed to reveal special uses of the roads. The School Bus

(Continued on page 18)

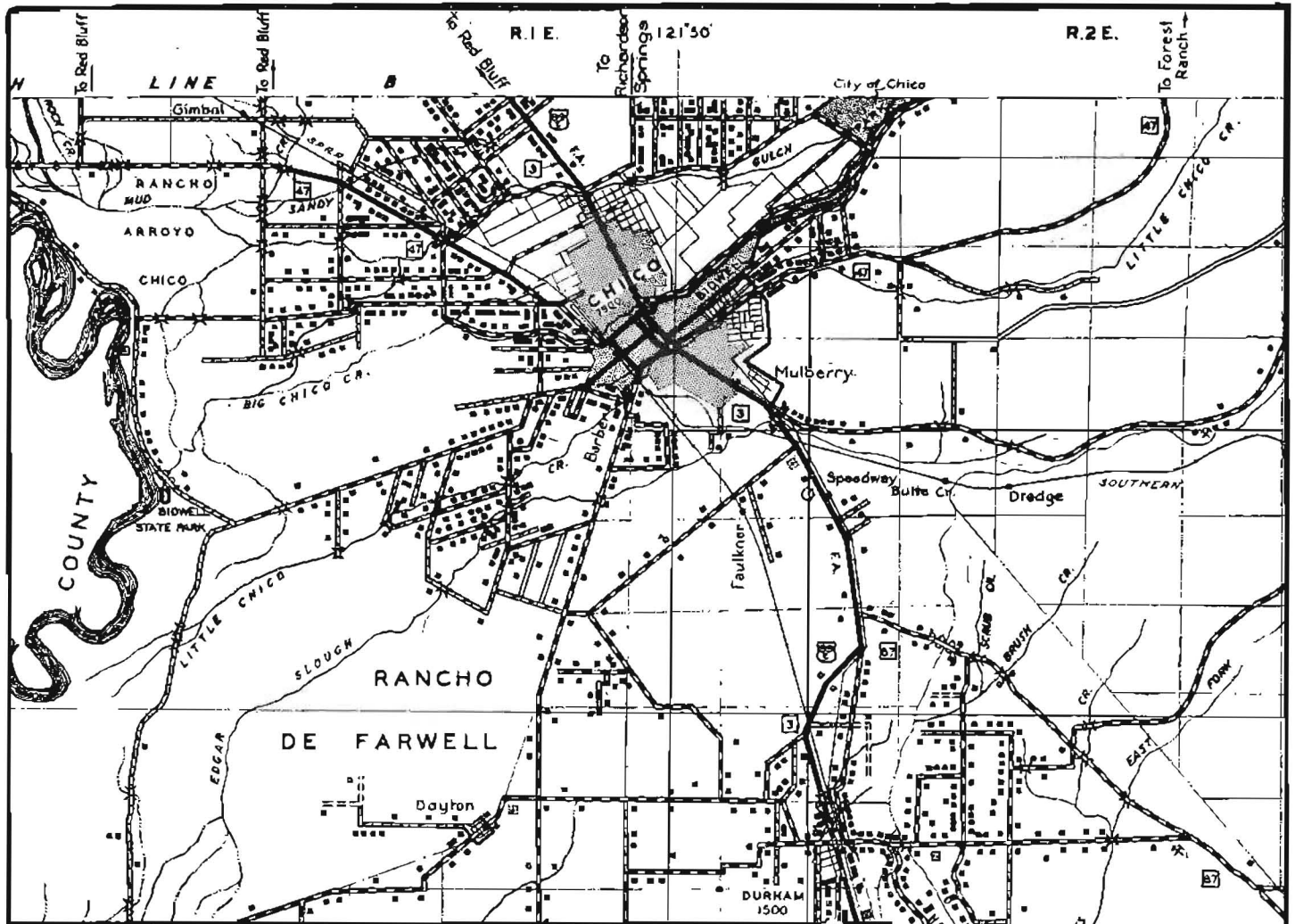
Two Reduced Sections of State Highway



Legend indicates Roads, Cities, Villages, Dwellings, Farms, Rivers, Bridges

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> ===== PRIMITIVE ROADS ===== UNIMPROVED ROADS ===== GRADED & DRAINED RDS. ===== SOIL SURFACED RDS. ===== METAL SURFACED RDS ===== BITUMINOUS ROADS ===== PAVED ROADS ----- AIR ROUTES ===== TUNNEL ===== FORD ===== FERRY-FF FREE; TF-TOLL ===== HIGHWAY BRIDGE ===== DRAWBRIDGE ===== SUSPENSION BRIDGE ===== ARCH BRIDGE ===== TRUSS BRIDGE | <ul style="list-style-type: none"> U.S. HIGHWAY STATE HIGHWAY ROUTE NO. FEDERAL AID SYSTEM RAILROAD & R.R. STATION ELECTRIC RAILROAD NARROW GAUGE R.R. R.R. TUNNEL GRADE CROSSING R.R. ABOVE-UNDERPASS R.R. BELOW-OVERPASS MILITARY AIRPORT DEPT. OF COMMERCE INTERMEDIATE "FIELD" COMMERCIAL OR MUNICIPAL FIELD MARKED AUXILIARY FIELD EMERGENCY FIELD | <ul style="list-style-type: none"> STATE COUNTY CITIES OR INCORPORATED CONGRESS CULTURE STATE COUNTY OR CORPORATION TOWNSHIP SECTION OR PARK OR IRRIGATION DRAINAGE CANAL SHIP OR HEAD OF DAM |
|---|---|---|

Planning Survey Map of Butte County



...s, Parks, Country Clubs, Gas Stations, Hotels or Resorts, Churches, Camps

CAPITAL
SEAT
OR VILLAGES
ORATED CITY

ATED AREA
RE NOT SHOWN

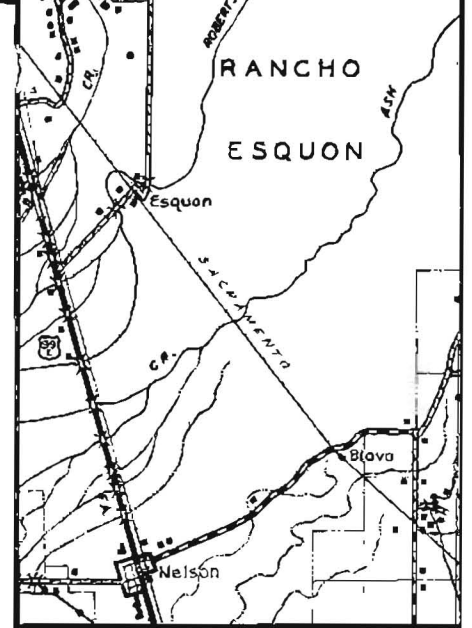
BOUNDARY
BOUNDARY
ATE LIMITS
HIP LINES
N LINES
RESERVATION BDY.
TION DITCH
GE-DITCH

R BARGE LINES
F NAVIGATION

- SMALL PARKS
- FAIR GROUNDS, RACE COURSES & SPEEDWAYS
- GOLF COURSE OR COUNTRY CLUB
- ATHLETIC FIELD OR AMUSEMENT PARK
- CEMETERY
- MINE OR QUARRY
- OIL OR GAS WELLS
- TANKS OR REFINERIES
- POWER PLANT
- RADIO STATION
- FIRE LOOKOUT STA.
- FOREST RANGER STA.

IN NOT
USE IN USE

- FARM UNIT
- DWELLING OR SUMMER COTTAGE
- ROWS OR GROUPS OF DWELLINGS
- STORE, GAS STA. OR SMALL BUSINESS
- TOWNHALL GRANGE OR COMMUNITY HALL
- HOTEL OR RESORT
- CHURCH
- SCHOOLHOUSE
- CORRECTIONAL INSTITUTIONS
- HOSPITALS
- FACTORY, WAREHOUSE OR INDUSTRIAL PLANT
- CAMP OR LODGE
- SAWMILL





Thirty-three foot finishing machine spreading leveling course at end of asphalt concrete surface run on State Highway 101.

Widening El Camino Real

By H. S. PAYSON, Resident Engineer

EL CAMINO REAL, or U. S. Route 101, in Santa Clara County, was widened to three 10-foot lanes between San Jose and Coyote during the summer of 1937. A widening and resurfacing project now in progress continues the three-lane pavement south to a point six miles north of Gilroy. The project is 10.9 miles in length and extends from Coyote to a point one-quarter mile south of Llagas Creek.

The existing pavement, except for the section through Morgan Hill, was Portland cement concrete 15 feet wide and 4 inches thick constructed in 1914 and 1915. In 1920 and 1922, concrete borders 2½ feet wide and 6 inches thick were added and the original pavement was covered with approximately three inches of asphalt concrete. Due to very heavy traffic loads, this light pavement has become extremely rough.

The traffic load carried by this pavement has steadily increased in volume and weight. Today peak loads on Sundays and holidays exceed 9000 vehicles, with enough heavy trucks to materially slow down traffic on the existing two-lane section. On week days traffic counts show in excess of 6000 vehicles, approximately one-fifth of which are trucks. Over one-half of the truck load consists of fast, heavy trucks.

Right of way has been secured to provide for ultimate construction of a four-lane highway, with provision made in the present 33-foot width for a future dividing strip when the additional lane is constructed. Through the city of Morgan Hill the existing curbs provided a 60-foot roadway. New right of way was secured to provide a street width of 90 feet between curbs, which will provide for two parking strips along the curbs, four 11-foot lanes, and a dividing strip in the center.

With the exception of the city of Morgan Hill and additional widths provided to conform to the existing pavement at the Madrone Underpass (which was completed in 1933) and the new bridge being constructed across Llagas Creek, the pavement will be uniformly 33 feet in width. Through the city of Morgan Hill asphalt concrete pavement 23 feet in width will be placed, with a road-mix surface on either side, to remove the existing high crown and smooth up the exceedingly rough street.

Alignment throughout the project is good, and only two line changes will be made. Between Stations 12 and 26 and Stations 106 and 127, Section C, the existing 900 foot and 1000 foot radius curves will be replaced with 3000 foot radius curves.

Drainage conditions, due to location of the highway on the floor of the Santa Clara Valley, have been inadequate to prevent flooding of the roadway during yast years. Those



Business section in Morgan Hill showing buildings set back to permit highway widening.

sections most subject to flooding are being raised. Also, a large number of additional, or larger, corrugated metal and concrete pipes are being provided to remove storm waters from the right of way as soon as possible directly through orchards to natural drainage channels.

NEW BRIDGE INCLUDED

The existing bridge across Llagas Creek has been the scene of numerous accidents due to location on a sharp curve with impaired sight distance, a narrow roadway surface, and a crowned roadway section. This bridge will be replaced by a rigid frame structure on a new location with adequate width and superelevation and satisfactory sight distance.

Through the business section of

Morgan Hill all buildings on the west side of the highway have been moved and rebuilt in their new location. The addition of new fronts with fresh plaster and paint, in conjunction with the better appearance of the widened street, will give Morgan Hill a vastly improved appearance.

Pavement is being laid in 33-foot widths, with traffic being carried along the borders while paving operations are in progress. Only minor delays have occurred due to this method of caring for traffic.

AUTOMATIC MIXING PLANT

The asphalt concrete plant located in the Pacific Coast Aggregates Company's yard at Coyote is constructed to proportion the mineral aggregate automatically. The multiple beam

scales are controlled by electric eyes which allow discharge from one bin only at a time, and a very uniform proportioning of materials is obtained. A time clock insures full mixing time in the pugmill. The time of weighing approximates closely that of hand operation.

Good progress is being made on the project, and it is anticipated that it will be completed within the time limit of 175 working days.

The contract was awarded on April 25, 1938, to Jones and King of Hayward, California. Asphalt concrete paving was started on June 23, 1938, and is progressing south at the rate of approximately 1000 lineal feet per day. The work is being performed under the direction of Jno. H. Skeggs, District Engineer.

Shovel removing surplus excavation while trucks are placing borrow material along newly widened section of roadway.



Relation of Scientific Engineering to Accident Prevention

(Continued from page 9)

demanding of the highway engineer. That highways can not be satisfactory if they are unreasonably hazardous is not open to question. Equally true is the statement that a highway must provide many other features besides safety in order to be satisfactory.

No one is more seriously concerned over traffic accidents than the highway engineer, nor does anyone have a higher regard for life and security against injury. No arbitrary value in dollars and cents can be placed on these things; and the engineer will not allow himself to be charged with any attempt to do so. He is, however, most insistent that whatever funds there are available primarily for safety features be used for those things that offer most in returns in accident prevention or reduction. It is in the search for such means and their application that the relationship of scientific engineering to accident prevention is best exemplified.

The problem is far from simple. There is no single formula or set of formulas that can be set up as final and not subject to modification.

Elements may be incorporated into highway design which unquestionably create a higher standard of safety than that which may now be present on a particular road—a higher standard of safety in this respect: that if the same amount of care will be exercised by motorists on the improved road that is used on the road in its present condition, the number of accidents will be reduced.

MOST PERPLEXING PROBLEM

If, however, the motorists demonstrate by their actions that other things are more desirable than safety, they may very easily by an unreasonable increase in speed and carelessness make the improved road more hazardous than it was before. This not only can happen but does happen. If it were caused by a few incorrigibles, the engineer would not concern himself; but when the average motorist reacts in this manner and completely nullifies the efforts of the engineer toward decreasing

the accident rate, a very perplexing problem is presented.

The highways must be designed and constructed for the average motorist. The highway engineer can acquire neither credit nor satisfaction by building roads which may be admittedly better from a purely physical standpoint, if at the same time they prove to be unsatisfactory in operation because of high accident frequency.

It will never be possible to prevent all accidents wholly by physical means, although highway engineers may sometimes feel that is what the public demands of them.

While recognizing that there are limits to what can be done by engineering, there must not be developed too strong a disposition to decide off-hand that this or that type of accident is not in any sense an engineering problem.

The successful engineer must know, as fully as it is possible for him to know, how the average motorist reacts to the various physical highway characteristics. This knowledge is just as essential as that he be conversant with the abstract laws of physics.

Features of design that not only permit but encourage higher speed, call for all the additional features needed to assure safety at these increased speeds. The average motorist has a thousand foibles for which the engineer can not fully compensate in his design; but where a reasonable degree of compensation is practicable, it can not be neglected on the ground that the motorist should overcome his own weaknesses. There will always remain too many situations where the engineer can be of no assistance.

(To be concluded in a later issue)

CHAIRMAN JUDAH OPENS OFFICE

Chairman H. R. Judah of the California Highway Commission has opened an office for the transaction of highway business on the mezzanine floor of the Hotel Palomar at Santa Cruz, in which city Mr. Judah lives. He has been connected with the publication of the Santa Cruz Daily News for many years.

New Maps Show Homes, Schools, Etc.

(Continued from page 13)

map covers the routes followed by the 2200 rural school buses in California. The Postal Route map distinguishes between the Rural Free Delivery and Star Mail routes. A Truck and Bus map will show the courses followed by common carriers.

Complete though these maps are, there is still missing a link in the evidence required. A traffic map giving the aggregate daily flow of all kinds of vehicles is therefore being made to supplement those series limited to special uses of the roads. The Traffic map is being compiled from the results of 11,900 traffic counts taken at 6400 rural traffic stations.

The General Highway map, the School Bus map, and the Postal Route map will be available November 1; the other series will follow. Taken in conjunction with one another and with tabulations that are being prepared, they will undoubtedly make it possible for highway administrators to visualize more clearly the complex nature of California's road problems and to bring thinking on these matters into sharper focus.

TREASURE ISLAND CONTRACTS

Two contracts for work on the California State Building, Golden Gate International Exposition, on Treasure Island, were awarded by Director of Public Works Earl Lee Kelly on August 1.

One contract for \$13,289 was awarded to Spencer Electrical Company of San Francisco for the electrical work, and the other for plumbing, heating, and ventilating work was awarded to O'Mara and Stewart, Ltd., San Francisco, at \$29,674.

A denizen of the bills of East Tennessee, who was appearing as a witness in a lawsuit, was being questioned as to his educational qualifications by the plaintiff's lawyer.

"Can you write?" asked the lawyer.

"Nope."

"Can you read?"

"Wa'al I kin read figgers pretty well, but I don't do so good with writin'."

"How is that?"

"Wa'al, take these here signs along the road when I want to go somers; I kin read how fur, but not whurto."



United States Post Office

Anaheim, Calif.

Mr. S. V. Cortelyou,
Los Angeles,
California.

Dear Sir:

I want to thank you on behalf of our rural carrier for your decision to construct the detour at Yorba bridge. It saves him 12 miles every time he covers his route and is quite a convenience to many ranchers on both sides of the river nearby. We all appreciate your heavy expenses in repairs due to last winter's floods and are very grateful for your cooperation in this matter.

Yours truly,

(Signed) LOUIS H. HASKINS,
Postmaster.

Ventura Junior College

Ventura, California

California Highways
and Public Works,
Sacramento, California.

Gentlemen:

Will you please place our school on the mailing list for your magazine?

Sincerely yours,

(Signed) D. R. HENRY,
Principal.

DRH:gh

Met Traditional Courtesy

California State Highway Department,
Sacramento, California.
Att: Supt. in charge of Dept. Foreman.

Dear Sir:

I am an automobile gypsy! I travel our great western areas from north to south and east to west. In these travels, I meet many men—some are merely human beings—some are cold and sarcastic in their contact with strangers—while some are worthwhile men with a love for their fellowman.

It was my misfortune some days ago to have a rather severe accident to my car about ten miles from Lost Hill, near Bakersfield. I met Mr. J. F. Shedd, your foreman, at that point. Mr. Shedd is one of the few who are really worthwhile. The courtesy, consideration and assistance that he gave me was of the extreme and he gave it to me freely.

I am writing this to call your attention to this man for he is exceptional,

and I trust you will give him all consideration possible.

Thanking you for your attention in reading this letter, I am,

Yours sincerely,

(Signed) W. S. PARK.

Spreads Good Will

Oakland, California.

Department of Public Works,
Sacramento, California.

Gentlemen:

I am very much interested in your magazine "California Highways and Public Works." At every opportunity I try to grab it as it comes in the mail; unfortunately for me there are others with the same idea in mind.

I wish to express my appreciation for your publication. It spreads good will and gives all who see and read it a better understanding of highway problems.

Sincerely yours,

W. J. RILEY.

WJR:mvh

An Appreciation and Reply

Mr. Earl Lee Kelly,
Sacramento.

Dear Mr. Kelly:

While driving along the new Coast Highway between Carmel and San Luis Obispo last Sunday, I encountered motor trouble near the residence of one of your engineers, Mr. Patrick Cordero.

I want to take a few minutes to commend Mr. Cordero for his assistance to me in my distress. As neither of us could repair the car, he took the trouble of driving me fourteen miles to get a mechanic, as there was no telephone within that distance. The accident happened just about sundown, and I thought I was surely in for a miserable night.

The next time you get in touch with Mr. Cordero I wish you would extend my heartfelt thanks to him.

Very truly yours,

(Signed) JAMES P. LANGLEY.

Mr. James P. Langley,
Berkeley, California.

Dear Mr. Langley:

I have received your letter of recent date in which you compliment one of the employees of the Department of Public Works.

It was very nice of you to write to me and you may be very sure that I will see

that Mr. Cordero's immediate superior is informed of the gracious treatment he endeavored to extend to you.

Sincerely yours,

EARL LEE KELLY,
Director of Public Works.

Watsonville, California.

Editor California
Highway Magazine.

Dear Sir:

I enjoy your magazine very much. I think it is a wonderful publication, also it is wonderful what your Department of Public Works is doing in our great State.

Thank you for sending it to me.

Very truly yours,

(Signed) GEORGE H. WINCHELL.

Interesting and Instructive

Calif. Highways
and Public Works,
Sacramento, California.

Gentlemen:

I have been the recipient of several recent copies of "California Highways and Public Works" and I am asking that my name be added to the mailing list for a monthly copy of this interesting publication, if consistent with your policy.

As a motorist, I find the magazine very instructive, presenting as it does the many difficulties encountered in the Department's efforts to complete the finest highway system in the world, and your engineers' initiative in overcoming them.

Yours very truly,

(Signed) O. L. EMIG,
San Mateo, California.

Stranded Motorist Helped

State of California
Department of Education

To the Director of State Road
Maintenance Division,
Redding, California

Dear Sir:

While returning by auto from Quinoy, an oil line broke and I was stranded on the Feather River Highway. One of your men, Mr. Stanley Lambert, of Pulga, came to my rescue and was most courteous and helpful giving several hours of his day off to help me reach Oroville. I am, and was, deeply grateful and wish you to know of his kindness and generosity.

Sincerely yours,

(Signed) WINIFRED VAN HAGEN

Funds Lacking for State Highways and Bridges

(Continued from page 3)

\$2,736,700 with an average of \$1,547,100 per fiscal year.

It is noted that the highest expenditure was in the 83d fiscal year prior to the addition of 6600 miles of county roads to the State Highway System. The year of lowest expenditure was the 87th fiscal year which ended June 30, 1936.

Assuming that construction funds will be allocated to the district at the rate of \$1,547,000 (the average for the past nine years), it will take approximately 28 years to accomplish the work listed above amounting to \$44,000,000.

It is apparent that sufficient construction funds cannot be obtained to provide the facilities listed above in the immediate future, but it seems imperative that some program should be adopted by which construction can be accelerated to a degree which will insure a gain of road improvements over loss by obsolescence and deterioration. The roads in this district are now at about the balance point between these factors and are on the down grade toward the latter.

Construction funds in an amount about double those allocated to the district for the past few years would weigh the balance in the proper direction.

INTER-AMERICAN TRAVEL CONGRESS

Preliminary agenda for the first Inter-American Travel Congress, which will be held at San Francisco April 14 to 21, 1939, indicate that a broad range of topics will be covered by delegates from every nation of the three Americas, whose objective will be the smoothing of travel barriers between the countries.

The congress, sponsored jointly by the Pan American Union and the Golden Gate International Exposition, will be held as a part of the Western World's Fair on Treasure Island in San Francisco Bay. Enthusiastic support has been given by all the nations of North, South and Central America, and with distribution of the preliminary agenda now under way, the program is taking firm shape.

Betty—Why do you wear such loud socks?
Bobby—To keep my feet from going to sleep.

An Appreciation

649 S. Olive Street,
Los Angeles, California,
July 28, 1938.

Mr. John W. Howe, Editor
California Highway and
Public Works,
Sacramento, California.

Dear Mr. Howe:

Some three years ago Mr. Earl Lee Kelly, Director of the Department of Public Works, at my request kindly had my name placed on the mailing list to receive your most interesting and instructive magazine. His courtesy in this matter is sincerely appreciated, for of the many publications I read there are two I look forward to receiving more than all of the others—one is your publication and the other is the National Geographic.

Since receiving your Official Journal I find that I take greater interest in the development of our highways and natural resources than ever before. Your interest in public welfare and the protection of human lives is deserving of highest commendation. The steady and consistent improvement in type of construction, with safety provisions, in the new highway development work is very commendable.

The rapidity with which the Department of Highways came to the aid of distressed districts at the time of the floods of last Spring is ample proof of the far reaching good which can be accomplished through coordinated efforts.

This question comes to my mind—How extensive is the use made of your publication in the school systems of our State? Has this phase ever been brought to the attention of Dr. Dexter or Dr. Sproul? I do not know of any other magazine published which gives a better geographical understanding of the various parts of the State than your booklet.

Governor Merriam's recent statement regarding the new development work in the San Bernardino Mountain area is intensely interesting to us in the southern part of the State. This realignment will permit easy and safe ingress and egress for residents of Southern California to the great San Bernardino Mountain recreational areas and save as much as thirty to forty minutes time in transporting fire fighting equipment from the Valley floor to the forests.

The courteous and efficient manner in which the employees of the Highway Department handle traffic at detours or places under repair is most praiseworthy. We are indeed fortunate in having such a fine organization as the Department of Public Works of California.

Yours sincerely,

AUTHOR O. GARRETT,
Tax Representative Bank of America and Capital Company, Los Angeles, Calif.

Good Roads Bring Visiting Throngs to State Fair

SACRAMENTO will truly become the heart of the State as traffic on all highways will lead to the California State Fair and Exposition, to be held September 2d to 11th inclusive.

No part of the State is better situated in regards to roads. Direct arteries from the north and south, east and west, are ready to carry what Secretary-Manager Robert Muckler expects to be a record attendance.

Each year during State Fair time, people in every county of the State are made conscious of the benefits of a unified highway system which permits easy travel from every section of California right to the gates of the fair grounds.

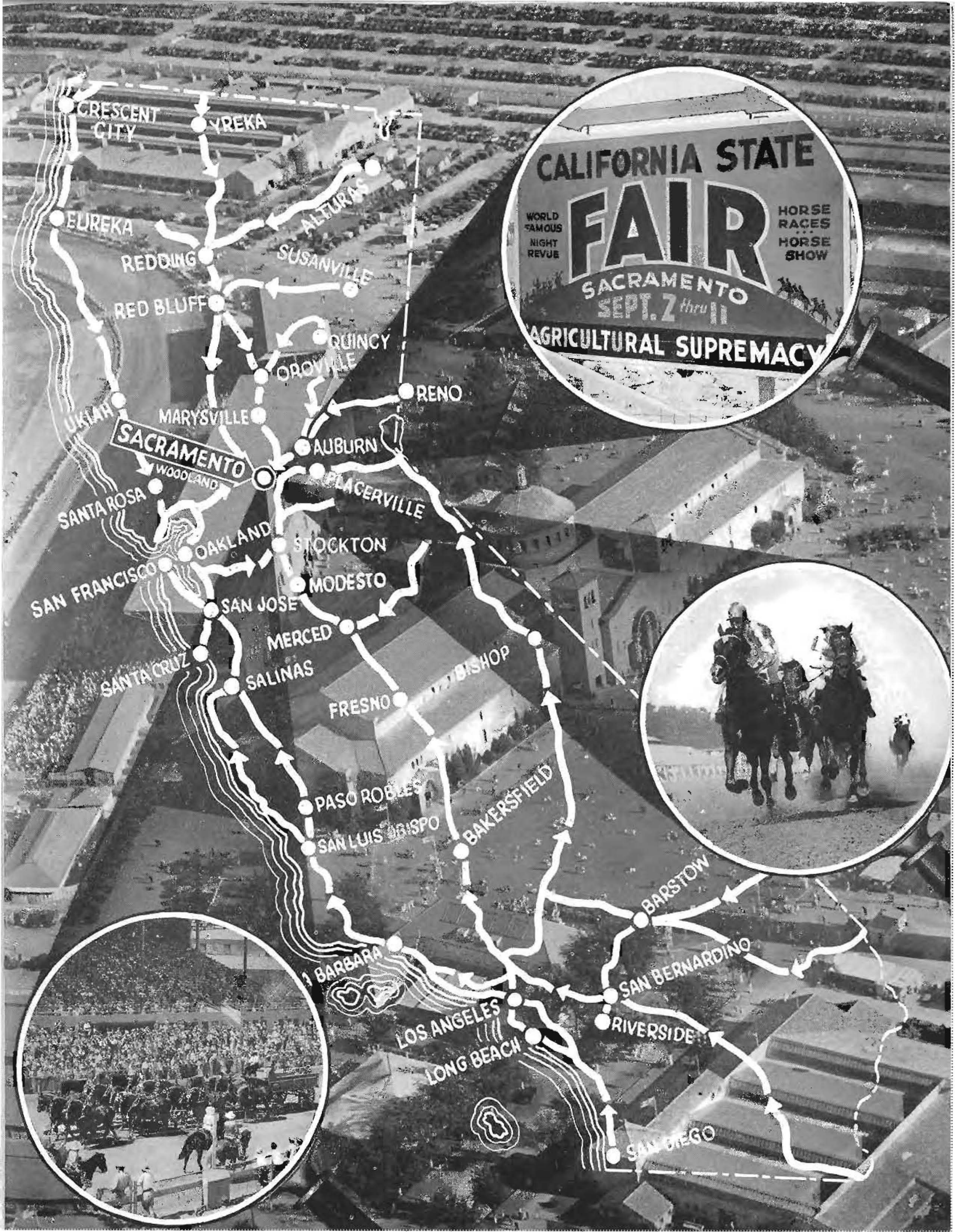
This year, visitors from the San Francisco Bay region will be able to travel over the new Altamont Pass Highway, recently completed at a cost of \$1,205,401.

Eliminating 45 dangerous curves, the new Altamont Highway, a two-lane divided road, will afford State Fair visitors from Oakland and other East Bay points a quicker and safer route to Sacramento.

The network of highways leading to Sacramento, under the administration of the Division of Highways of the Department of Public Works and the California Highway Commission, has been brought to safety and comfort standards compatible with the development of modern motor vehicles.

Easy transportation of exhibits, coupled with additional electrical wiring and display improvements, is bringing a record increase in entries, especially from small individual ranchers and live stock men.

Some of the factors expected to attract visitors from even the most outlying districts are a \$1,000,000 building and improvement program: An outstanding racing program for \$50,000 in purses; larger and more artistic exhibits by California's counties; the \$2,000,000 live stock parade and farm machinery show; the world-famous outdoor night revue, augmented by a chorus of 250 voices, and the nationally recognized Horse Show.



CALIFORNIA STATE
FAIR
 WORLD FAMOUS NIGHT REVUE
 HORSE RACES HORSE SHOW
 SACRAMENTO
 SEPT. 7 thru 11
 AGRICULTURAL SUPREMACY



Coast Highway Along Malibu Reconstructed With Divided Lanes

By RALPH C MEYERS, District Office Engineer

DURING the past few years the volume of traffic on the State highway which skirts the ocean shore between Santa Monica and Oxnard has increased to the point where it has become necessary to reconstruct the road at certain locations. In 1936 the section of this highway at the crossing of Walnut Creek was reconstructed on new location with a new bridge across the canyon about 19 miles west of Santa Monica.

On October 1, 1937, a contract was awarded by the Director of Public Works for construction on improved alignment and grade of 1.6 miles between Walnut Canyon and Trancas Beach and on October 26 a contract was awarded for similar reconstruction of 3.1 miles between Trancas

Beach and Encinal Canyon. In conjunction with these road improvements the State entered into a third contract for the widening of the bridges across Trancas and Zuma Creeks.

ADEQUATE FOR TRAFFIC

Reconstruction under these contracts eliminates the most antiquated portions of the route and will provide roadway facilities of modern design capable of adequate service under present day traffic conditions.

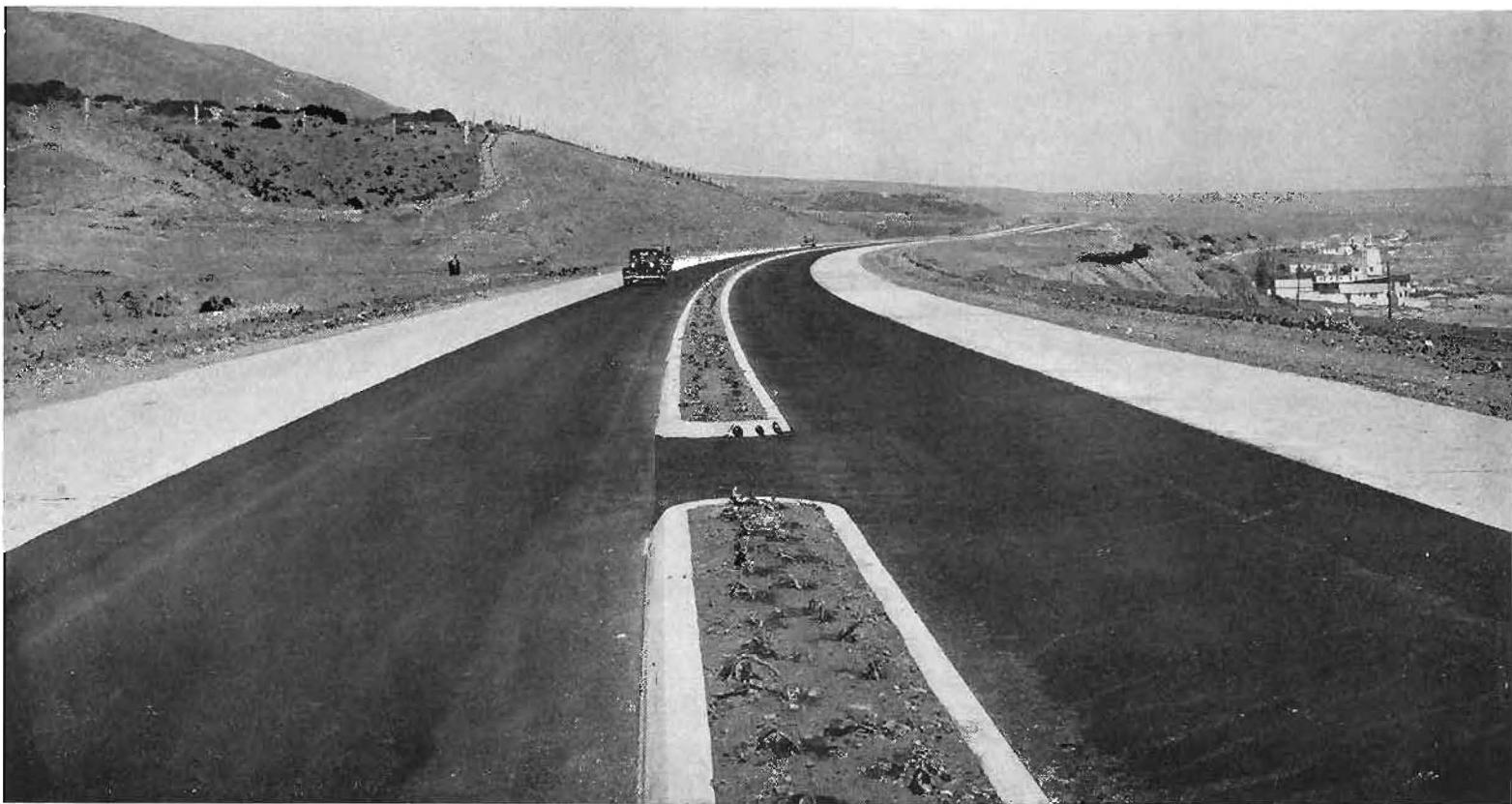
In general the work has consisted of placing two 11-foot lanes of Portland cement concrete pavement with 28 feet of plant-mixed surfacing between them. The shoulders on each side of the pavement are being oiled for a width of 15 feet, making a total

width of roadway of 80 feet or 28 feet on each side of curb.

DIVIDING STRIPS CONSTRUCTED

Throughout the length of the improvement a parting strip is being constructed on the central four feet of the 28-foot plant-mix surfacing. This strip will provide a divided pavement of four lanes, two for each direction of travel. The outside pavement lanes are 11 feet wide and the inside, or passing lanes, are 12 feet wide.

Two types of parting strip construction have been used in dividing the traffic ways. On the portions of the route which are not heavily populated the strip consists of concrete curbs four feet apart with the space between filled with soil planted to ice plant.



On portions of the route not thickly populated the division strips consist of concrete curbs 4-feet apart with planting between.



Division strip on this section will be 4-foot wide with raised white arrows bordered by double white lines.

This curbed type is being constructed on two sections, each approximately one mile in length. The curbed and planted dividing strip is broken at intervals to provide for necessary crossings.

Along the remaining portions, which are built up and populated, a dividing strip consisting of raised and painted diagonal arrows is used. This type is also four feet wide and consists of a double white traffic stripe on the outside borders, with raised arrows, painted white, placed within these stripes.

RAISED ARROW STRIPS

The arrows are set diagonally with the center line and alternately point in opposite directions. This type of dividing strip presents a roughened surface in the center of the pavement which discourages travel but does not prevent crossing the highway. The raised arrow type of traffic way separation has proven quite successful on portions of the Ramona Boulevard-Garvey Avenue route between Los Angeles and Pomona.

The reconstruction of this portion of the Roosevelt Highway will undoubtedly facilitate the movement of the large volume of traffic along the highway. The improved line and grade and traffic separation will provide for safer travel conditions.

The two road contracts are held by the Maceo Construction Company of

Los Angeles and the contract for widening the bridges across Zuma and Trancas Creeks was performed by John Strona of Pomona.

The estimated cost of the work included in the three contracts is \$424,000 and it is anticipated that all work will be complete by September.

Bay Bridge Traffic Shows Increase

AN AVERAGE of 23,951 vehicles per day crossed the San Francisco-Oakland Bay Bridge during the month of July, it was announced by State Director of Public works Earl Lee Kelly from a monthly traffic report filed by State Highway Engineer C. H. Purcell. This was a slight increase over June, which had an average of 23,806 vehicles. However, it represented a drop of approximately 5000 vehicles per day from the same month a year ago, when automobile ferry rates were at a parity with the bridge. The daily average for July, 1937, was 28,582 vehicles.

There was a total of 742,472 vehicles in July crossing the bridge, as compared to 714,173 in the preceding month.

Total collections for the month of July were \$386,723.15.

Trucks fell off last month from the preceding month, with a total of 34,414 for July and 35,530 for June, which was a day-shorter month.

Freight pounds also decreased in

July, with 87,499,250 pounds, compared to 92,797,000 for June.

Total number of vehicles using the bridge for the first seven months of 1938 is 4,809,426. Since the bridge opened on November 12, 1936, 15,253,976 vehicles have crossed the span.

Comparative figures and totals follow:

| | *Total July | *Total June | *Total since opening |
|----------------------|----------------|----------------|----------------------------|
| Auto trailers..... | 1,829 | 1,378 | 24,451 |
| Passenger autos..... | 667,608 | 641,853 | 14,220,259 |
| Motorcycles | 3,034 | 2,736 | 52,696 |
| Tricars | 1,001 | 1,102 | 16,123 |
| Buses | 13,467 | 11,273 | 180,600 |
| Trucks | 34,414 | 35,530 | 523,365 |
| Truck trailers. - - | 1,538 | 1,588 | 31,171 |

*These totals exclude toll exempt vehicles.

"The boy who gets this job must be fast."

"Mister, I'm so fast I can drink water out of a sieve."

Casting Director—In this picture about Hollywood, I've cast you two fellows as assistant directors.

Actors—Yes.

Casting Director—Ah, I see you already know your lines.



These men, civil service employees, operate four tow cars and fire truck owned by Bay Bridge providing service for stalled motorists.

Motorists Get Quick Aid on Bay Bridge

MOTORISTS crossing the San Francisco-Oakland Bay Bridge may have the services day or night of a crew of 10 men, who operate the span's own tow trucks. Patrons of the bridge, stalled for any reason on its $4\frac{1}{2}$ mile length, need only smash the glass-covered dial labeled "tow service" contained in one of the 33 red-colored boxes placed at convenient intervals along the north side of the upper and lower decks.

Within a few minutes a bridge tow car will come to the motorist's aid, equipped to provide him with gasoline, to change a tire, or to tow him off the span. A charge of 30 cents a gallon, with a minimum of three gallons, is made for gasoline.

Gallant bay bridge officials make no charge to women motorists for changing a tire, but levy fifty cents on men drivers.

It costs the small sum of \$1.30 to have your automobile towed off the span within a convenient radius of either end of the bridge. Motorists belonging to automobile clubs may have their tow charges paid for by the club.

A fleet of three tow cars and one truck comprises the bay bridge's roadside service. The State's Vehicle Code does not permit a private towing service to operate on the bridge.

The tow-boxes, said to be the only ones of the kind, were essential because of the tremendous length of the bridge and the necessity to keep traffic moving on the great span.

Out of a total of 15,048,565 vehicles crossing the bridge since it was opened, 11,908 vehicles have received aid from the span's Roadside Maintenance Service, it was announced by Principal Bridge Engineer Chas. E.

Andrew. This is equivalent to an average of 18.99 vehicles serviced per day, or one out of every 1,281 automobiles crossing the bridge.

More motorists were stalled on the bridge due to lack of gasoline than for any other reason, it was revealed, with 6,514 vehicles supplied with gasoline or oil. A total of 3,554 vehicles had been towed because of engine trouble, lack of spare tire, or accident; and 1,781 tires were changed on the span.

The bay bridge's own fire truck has extinguished a total of 59 vehicular fires, Mr. Andrew announced.

The San Francisco-Oakland Bay Bridge, U. S. Routes 40-50, is maintained and operated by the California State Division of Highways.

"Hey, mister! Your engine's smoking."
"Well, it's old enough."

Highway Commission Head Urges Necessity of Protecting Gas Tax

(Continued from page 7)

smallest amounts, in view of the extreme necessity for the use of every dollar for highway purposes must be definitely stopped.

Secondly, the people of California must hold tight to gasoline tax income for highway purposes because the outlook under existing conditions in this State for the use of this money to splendid advantage in the perfection of a co-ordinated highway system in the State, is *vitally imperative*. Earl Lee Kelly, Director of the Department of Public Works, on more than one occasion in public addresses has said that even today California is eight years behind in its highway development, as measured against the demands and necessities brought about through the tremendous increase in the registration of automotive units and the normal economic, population and industrial growth of the State.

California now has registered by its own automotive owners, one-tenth of all the cars and trucks in the entire United States. But that is only part of the story. California is the most widely patronized and extensively traveled world sector by the recreational motorist. These visitors, numbering in the first six months of 1938 524,375 persons, all traveling in automobiles, also pay their gasoline tax with every gallon they buy in the State.

Even adding to this, the tax paid by California motorists, still the amount of money realized from these sources is not sufficient today to properly round out a modern highway program in this State. All the more reason, therefore, that we should conserve and subserve every dollar of gasoline tax income through a constitutional restriction for the exclusive legal use of the money for highway construction, reconstruction and maintenance.

Some slight idea of what the future holds in highway development and its cost in this State, may be gleaned from the report recently released in the official magazine of the National Association of Highway

Decimal Point in Wrong Place Causes Gas Tax Shrinkage

In its official release to the press on July 27, 1938, the State Board of Equalization stated that the gasoline tax assessment for June, 1938, represented an increase of 3.35 per cent over the assessment for June of 1937. Actually the increase amounted to .33564 of one per cent or one-tenth of the amount quoted in the release. The inaccuracy in placing the decimal point creates an erroneous impression to the extent that an increase of 3.35 per cent would have amounted to \$155,506 whereas the actual increase amounted to \$15,535.43.

Assessments for the first six months of the current calendar year amounted to \$24,997,853.22 as compared with \$24,912,117.43 for the corresponding period of 1937. The increase of \$85,735.79 represents an increase of .344 of one per cent indicating that June was a typical month on the basis of the average for the first half of the year.

Officials compiled from evidence and estimates given by the various states.

In the case of California it will be necessary within a reasonable period of time to rebuild 4600 miles of highway, to widen 1200 miles, to relocate 1000 miles and to widen or rebuild 2300 bridges. This program has an estimated cost of \$420,000,000. California shows the most extensive future program of any State in the Union. Ohio is next with a necessary expenditure in the same period of \$342,000,000.

It may be easily seen by the California voter that it is to his interest as a citizen and taxpayer to conserve gasoline tax money for highway purposes, exclusively. The money has

Asphalt Conference Will Be Held Oct. 10-13

The Montana National Bituminous Conference of 1938 will be held at Biloxi, Mississippi, October 10 to 13. The program is intended to cover all phases of asphalt usage and is divided into four sections as follows:

(1) Progress and research as related to construction and maintenance of bituminous surfaces; (2) Fundamentals of bituminous construction; (3) Construction of bituminous surfaces; (4) Maintenance of bituminous surfaces.

Chairmen of these sections are: (1) N. W. McLeod, Research Engineer, Department of Highways and Transportation, Regina, Canada; (2) T. E. Stanton, Materials and Research Engineer, Division of Highways, California Department of Public Works; (3) V. B. Steinbaugh, Deputy Commissioner-Chief Engineer, Michigan State Highway Department; (4) A. B. Nuss, State Highway Engineer of Kansas.

MOTOR TOURISTS INCREASE

Approximately 344,556 motor tourists visited California during the first third of this year, it is estimated by the touring bureau of the Automobile Club of Southern California. The figure represents over 16,900 more motor visitors from other states and countries than the tourist influx during the first four months last year.

The Eighteenth Annual Meeting of the Highway Research Board will be held on November 30-December 2, 1938, at the National Academy of Sciences, Washington, D. C.

been so well and capably spent ever since the formation of the State Highway Department, and the results in better business and general prosperity in the State have been so pronounced as a consequence, that no citizen need fear about voting "Yes" on the constitutional amendment.

Remember that in California more than in any other State in the Union, the gasoline tax is not a tax. It is a first rate investment for increased prosperity.



INVESTIGATIONS of applications for allotments from money appropriated to the Emergency Fund by Chapter 11, Statutes of 1938, Extra Session, for restoration of public property, levees, flood control work, county roads, and bridges, damaged by recent floods throughout the State, and the supervision of restoration work, have been continued by the Division of Water Resources representing the Department of Public Works, pursuant to instructions of the Director of Finance.

Reports and recommendations on 120 of these applications have been made by this Division and State Reclamation Board to the Director of Finance. Allocations totaling \$2,225,000 have been approved by Governor Merriam. Some of the work under these allocations is being performed by the Division and other work is being done by the applicants under contracts with the Department of Public Works. Fifty-three contracts are now in force for work which will cost \$1,500,000.

In the investigations of applications for repairs valuable assistance has been given by the Maintenance and Bridge Departments of the Division of Highways and the Bridge Department has aided greatly in the approval of plans for bridge repairs.

IRRIGATION DISTRICTS

Award of contract for construction of the first forty-three miles of the Coachella branch of the All American Canal, was announced early in the month from Washington. The branch will extend for more than 100 miles to a point north of Salton Sea and will provide irrigation for an area of some 350,000 acres, lying to the east of Imperial Irrigation District and within the Coachella Valley County Water District. The main section of the All American Canal, which was started in 1934, will be completed and placed in operation next year for service of the 500,000 acres now irrigated in the Imperial Valley from the old main canal that loops through Mexican territory.

San Dieguito Irrigation District has ob-

tained assurance of Federal assistance in carrying out extensive improvements. Plans contemplate construction of two new pumping plants, an elevated steel tank of 75,000 gallon capacity, and a 200,000 gallon balancing reservoir. Estimated cost is \$111,000.

SUPERVISION OF DAMS

Application has been received for the construction of the Rancho Del Ciervo Dam in Santa Barbara County.

Applications for the repair of Los Serranos Dam, Saw Pit Dam, Nelson Dam, Big Santa Anita Dam and Peoples Weir Dam have been received, of which Nelson and Los Serranos have been approved.

Applications are approved for construction of the Charles Lee Tilden Park Dam and for enlargement of Lower St. Helena Dam.

WATER RIGHTS

Thirty-five applications to appropriate were received during June. Eight were denied, ten approved and rights under ten permits were confirmed.

Project inspections preliminary to the issuance of license or revocation of permit were made in the San Bernardino area in the Sierras except the Tahoe and Mono Basin areas, and in Siskiyou and Tehama counties.

TOPOGRAPHIC MAPPING

Field work on the San Bernardino No. 3 and No. 4 quadrangles has been completed and office work has been completed on the Downieville No. 1, Avenal and Kramer No. 2 quadrangles, and is progressing on the Kramer No. 4 quadrangle.

SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

The field work of the office is progressing satisfactorily and all points of diversion are being visited and the discharges of the various pumping plants measured. The irrigation of sugar beets is about completed and in some places the harvest of the crop has begun. During the coming month the Sacramento River will reach its low point for the summer and by this time next month should start to rise.

The stream flow into the delta shows a marked decrease from last month but is still above normal. The flow of the Sacramento River at Sacramento on July 23d was about 9100 cubic feet per second; on the same day

the flow of the San Joaquin River at Lathrop was about 10,500 cubic feet per second. On the corresponding date last year, the flows were 3400 and 1650 cubic feet per second respectively.

CENTRAL VALLEY PROJECT

Working under a cooperative agreement with the U. S. Bureau of Reclamation, the Division of Water Resources, representing the Water Project Authority of the State of California, has continued engineering studies in connection with the Central Valley Project. The work has comprised the obtaining of data in the field and its analysis for use in connection with negotiations for the acquisition of water rights of lands bordering the San Joaquin River which are now being served by that stream. The field work has included topographic, hydrologic, geologic and soil surveys which were used in making studies and preparing reports and maps on land and water conditions. Studies have been continued of matters affecting the disposal of water made available by the project, including analyses of present ground water conditions and the requirements of certain areas for additional supplies.

Negotiations have been continued with public utility companies for the relocations of their facilities affected by the construction of certain units of the project.

FLOOD CONTROL AND RECLAMATION

The construction of a bridge across the borrow pit of the west levee of the Sutter By-pass at Sacramento Slough was completed. This bridge is approximately 175 feet long, the deck at ground level.

Work has continued in repairing flood damage in Glenn, Shasta, Butte and Tehama counties. The work of repairing 16 breaks on the Cherokee Canal in Reclamation District No. 833 has been completed, as has also the work on the northern bank of Honcut Creek.

Money has been allocated by the Reclamation Board for the construction of a county bridge across the borrow pit of the Dry Creek lateral of the Bear River levee system at a cost of \$8,200.

Youth—Now on this ring I should like you to engrave: "For my darling Muriel."

Jeweler—Would it not be better to have simply: "For my darling?" You see, sir, it will be at least a week before we can let you have the ring.

Highway Bids and Awards for the Month of July, 1938

AMADOR COUNTY—Between 0.3 mile east of Plymouth and Fiddletown, about 5.5 miles liquid asphalt to be furnished and applied. District X, Feeder Road. Stewart M. McGaw, Stockton, \$4,104; Chas. Kuppering, Lakeport, \$4,566; C. F. Fredericksen & Sons, Lower Lake, \$3,505; Sheldon Oil Co., Suisun, \$3,432; Hayward Building Material Co., Hayward, \$3,576; Lee J. Immel, Berkeley, \$3,666; Garcia Construction Co., Irvington, \$3,536; Acme Transportation, Inc., Oakland, \$3,559; Oilfields Trucking Co., Bakersfield, \$3,995; Powers & Patterson, Lower Lake, \$3,726; A. A. Tieslau, Berkeley, \$3,598; J. B. Breen, Sacramento, \$3,421; Edward A. Forde, San Anselmo, \$3,808. Contract awarded to Pacific Truck Service, Inc., San Jose, \$3,206.88.

BUTTE COUNTY—Between six miles south and one mile south of Paradise, about 4.6 miles, a graded roadbed to be constructed. District III, Feeder Road. Claude C. Wood, Stockton, \$44,610; M. J. Ruddy, Modesto, \$45,771; George K. Thompson and Co., Los Angeles, \$49,061; Hemstreet and Bell, Marysville, \$50,865; Johnston Rock Co., Inc., Stockton, \$62,635; Ralph A. Bell, Monrovia, \$79,955. Contract awarded to Fredericksen & Westbrook, Lower Lake, \$43,570.

CALAVERAS COUNTY—Between South Ford of Mokelumne River and Herberts Ranch, about 1.8 miles to be surfaced with untreated crushed gravel or stone and road-mix surfacing. District X, Feeder road. Hayward Building Material Co., Hayward, \$8,309; Piazza & Huntley, San Jose, \$9,847; Acme Transportation, Inc., Oakland, \$9,871. Contract awarded to Garcia Construction Co., Irvington, \$6,623.50.

CONTRA COSTA COUNTY—Between Muir and Willow Pass, about 8 miles to be graded, soil cement base and crusher run base to be constructed and surfaced with plant-mixed surfacing and 3 reinforced concrete slab bridges to be constructed. District IV, Route 106. Section C. Granfield, Farrar and Carlin, San Francisco, \$342,583; Fredericksen and Westbrook, Lower Lake, \$335,469; Hanrahan Co., Redwood City, \$348,348; N. M. Ball Sons, Berkeley, \$371,006; Heafey-Moore Co. & Fredericksen & Watson Construction Co., Oakland, \$369,197; George Pollock Co., Sacramento, \$354,376; A. Teichert & Son, Inc., Sacramento, \$468,582. Contract awarded to Macco Construction Co., Clearwater, \$312,555.40.

FRESNO AND MADERA COUNTIES—A bridge across San Joaquin River about 4 miles northeast of Auberry, consisting of a through steel truss span with timber stringer approach spans with concrete decks. District VI, Feeder road. Robert McCarthy, San Francisco, \$29,873; Albert H. Siemer & John Carcano, San Anselmo, \$30,661; J. S. Metzger & Sons, Los Angeles, \$31,798; Trewitt-Shields & Fisher, Fresno, \$33,589; The Robertson Co., Los Angeles, \$36,454. Contract awarded to S. A. Cummings, San Diego, \$29,379.90.

HUMBOLDT COUNTY—At Greenlaw Bluffs, about 0.25 mile to be graded and surfaced with plant-mixed surfacing and sacked concrete riprap to be placed. District I, Route 1, Section E. Claude C. Wood, Lodi, \$57,330; N. M. Ball and E. E. Smith, Berkeley, \$58,727; Lee J. Immel, Berkeley, \$58,744; Mercer, Fraser Company, Eureka, \$59,901; Hemstreet and Bell, Marysville, \$61,012; Fred A. Maurer and Son, Eureka, \$62,472; Ransome Company, Emeryville, \$65,392; Guerin Bros., San Francisco,

\$77,391. Contract awarded to Harold Smith, St. Helena, \$56,824.

INYO COUNTY—Between the west city limits and Main Street, Bishop, about 0.5 mile to be graded and surfaced with roadmix surfacing. District IX, Route 76, Section Bis. A. S. Vinnell Co., Alhambra, \$9,818; E. S. and N. S. Johnson, Pasadena, \$9,647; Rexroth and Rexroth, Bakersfield, \$8,448. Contract awarded to Basich Bros., Torrance, \$7,047.

INYO COUNTY—Near Camp Sabrina, about 0.8 mile to be graded and surfaced with imported surfacing material and penetration oil treatment applied thereto, and a steel beam and reinforced concrete deck bridge to be constructed. District IX, Route 76, Section B. A. S. Vinnell Co., Alhambra, \$27,348; Basich Brothers, Torrance, \$25,432. Contract awarded to E. S. and N. S. Johnson, Pasadena, \$21,960.

KERN COUNTY—Across Calloway Canal, about 3 miles west of Bakersfield, a reinforced concrete slab bridge to be constructed. District VI, Route 58, Section L. Rexroth and Rexroth, Bakersfield, \$7,473; J. S. Metzger & Son, Los Angeles, \$10,336; Griffith Company, Los Angeles, \$6,755; F. A. Greenough, Bakersfield, \$7,293; Macco Construction Co., Clearwater, \$6,776; Palo Alto Road Materials Co., Palo Alto, \$8,411. Contract awarded to Franzini & Fredenburg, San Rafael, \$6,486.50.

KERN COUNTY—Between one mile south and two miles south of Rosedale, about one mile to be graded and oiled and two bridges to be constructed. District VI, Feeder Road. Rexroth and Rexroth, Bakersfield, \$11,997; John Jurkovich, Fresno, \$11,989; F. A. Greenough, Bakersfield, \$15,150; Griffith Co., Los Angeles, \$12,192; E. G. Perham, Los Angeles, \$12,033; Franzini & Fredenburg, San Rafael, \$12,407. Contract awarded to J. E. Anderson & George France, Visalia, \$11,107.24.

KINGS COUNTY—Between Armona and Hanford, 3.5 miles to be graded and paved with asphalt concrete. District VI, Route 10, Section C. Han. Piazza and Huntley, San Jose, \$98,585; N. M. Ball Sons, Berkeley, \$98,851; Griffith Company, Los Angeles, \$106,707; Warren Southwest, Inc., Los Angeles, \$117,219. Contract awarded to Union Paving Co., San Francisco, \$97,681.05.

LOS ANGELES COUNTY—Between 190th Street and Lomita Boulevard, about 4.6 miles to be graded and surfaced with plant-mixed surfacing. District VII, Route 165, Section A, Los Angeles. Sully-Miller Contracting Co., Long Beach, \$121,819; L. A. Paving Co., Los Angeles, \$131,765; C. O. Sparks and Mundo Engineering Co., Los Angeles, \$143,681; Claude Fisher Co., Ltd., Los Angeles, \$129,196; George R. Curtis Paving Co., Los Angeles, \$116,178; A. S. Vinnell Co., Alhambra, \$114,980; Martin Bros., Trucking Co., Long Beach, \$125,466; Oswald Bros., Los Angeles, \$114,302; J. E. Haddock, Ltd., Pasadena, \$127,951; Basich Bros., Torrance, \$115,285; United Concrete Pipe Corp., Los Angeles, \$116,758. Contract awarded to Griffith Co., Los Angeles, \$108,359.55.

LOS ANGELES COUNTY—Between Fair Oaks Avenue in South Pasadena and Glenarm St. in Pasadena, about 0.8 mile to be graded and paved with Portland cement concrete, asphalt concrete, and plant-mixed surfacing. District VII, Route 205, South Pasadena. Pasadena. Claude Fisher Co., Ltd., Los Angeles, \$126,768; C. O.

Sparks & Mundo Engineering Co., Los Angeles, \$127,648; George R. Curtis Paving Co., Los Angeles, \$115,734; Griffith Co., Los Angeles, \$126,592; W. E. Hall Co., Alhambra, \$145,779; Basich Bros., Torrance, \$109,091. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$107,378.00.

LOS ANGELES COUNTY—Between Pasadena Avenue and Avenue 22, about 0.9 mile to be graded and paved with asphalt concrete, Portland cement concrete and plant-mixed surfacing. District VII, Route 165, Section L. A. Warren Southwest, Inc., Los Angeles, \$98,697; George J. Bock Co., Los Angeles, \$115,966; Radich and Brown, Los Angeles, \$96,479; Griffith Company, Los Angeles, \$113,973; Vido Kovacevich, South Gate, \$101,476; George R. Curtis Paving Co., Los Angeles, \$99,627; J. E. Haddock, Ltd., Pasadena, \$141,808. Contract awarded to Bebek & Brkich, Los Angeles, \$94,651.00.

LOS ANGELES COUNTY—A bridge across Malibu Creek, about 10 miles northwest of Santa Monica to be repaired. District VII, Route 60, Section A. Paul D. Lawrence Co., Los Angeles, \$29,882; Byerts & Dunn, Los Angeles, \$32,516; R. R. Bishop, Long Beach, \$29,958; Carlo Bongiovanni, Beverly Hills, \$31,963; The Contracting Engineers Co., Los Angeles, \$29,211. Contract awarded to J. S. Metzger & Son, Los Angeles, \$26,245.00.

LOS ANGELES COUNTY—A reinforced concrete girder bridge across Santa Clara River, about 5 miles east of Saugus, consisting of eight 50-foot spans, and two 12-foot 3-inch spans on reinforced concrete piers and abutments. District VII, Route 23, Section I. Dimmitt & Taylor, Los Angeles, \$77,258; R. H. Travers, Los Angeles, \$85,903; Gibbons & Reed Co., Burbank, \$80,909; Byerts and Dunn, Los Angeles, \$75,500; R. R. Bishop, Long Beach, \$76,195; Bennett & Taylor, Los Angeles, \$88,990; John Strona, Pomona, \$77,000; C. O. Sparks & Mundo Engineering Co., Los Angeles, \$78,927; Carlo Bongiovanni, Beverly Hills, \$73,534; J. E. Haddock, Ltd., Pasadena, \$74,330; Oscar Oberg, Los Angeles, \$80,589; The Contracting Engineers Co., Los Angeles, \$73,835; J. S. Metzger & Son, Los Angeles, \$76,343; L. W. Odell & Geo. J. Bock Co., Los Angeles, \$90,839. Contract awarded to Griffith Co., Los Angeles, \$67,191.

LOS ANGELES COUNTY—Over Arroyo Seco Parkway at Avenue 60, three 40-foot reinforced concrete slab spans, on concrete piers and abutment to be constructed as an extension to an existing bridge and the northerly approach thereto and roadway on extension surfaced with asphalt concrete. District VII, Route 205, Section L. A. Byerts & Dunn, Los Angeles, \$59,528; L. W. Odell & G. J. Bock Co., Los Angeles, \$65,110; Dimmitt & Taylor, Los Angeles, \$65,770; Fred E. Potts Co., Los Angeles, \$64,446; John Strona, Pomona, \$64,952; J. E. Haddock, Ltd., Pasadena, \$61,798; Carlo Bongiovanni, Los Angeles, \$62,114. Contract awarded to The Contracting Engineers Co., Los Angeles, \$57,436.

MENDOCINO COUNTY—Between southerly boundary and Hopland, about 7 miles to be surfaced with plant-mixed surfacing. District I, Route 1, Section L. Piazza and Huntley, San Jose, \$94,550; Mountain Construction Co., Sacramento, \$102,037; Hemstreet and Bell, Marysville, \$99,107; J. A. Casson, Hayward, \$105,881; Union Paving Co., San Francisco, \$91,366; Pacific States Construction Co., San Francisco, \$99,458; N. M. Ball Sons, Berkeley, \$85,328; A. G. Raisch, San Francisco, \$110,780. Contract

awarded to Hanrahan Co., Redwood City, \$84,900.50.

MENDOCINO AND LAKE COUNTIES—5.5 miles east of Route 1 and portions between 17 and 23 miles east of Lucerne, about 0.8 mile to be graded and surfaced with roadmix surfacing and sacked concrete riprap to be placed. District I, Route 15, Sections A, C. E. A. Forde, San Anselmo, \$45,882; Fred J. Maurer & Son, Eureka, \$45,981; Claude C. Wood, Lodi, \$46,724; Pacific States Construction Co., San Francisco, \$47,121; Hemstreet and Bell, Marysville, \$48,095; N. M. Ball Sons, Berkeley, \$54,707. Contract awarded to Lee J. Immel, Berkeley, \$44,301.65.

MERCED COUNTY—17 miles east of Los Banos, a reinforced concrete bridge across San Joaquin River to be constructed, an existing reinforced concrete bridge to be widened, and 0.5 mile of roadway approaches to be graded and surfaced with plant-mixed surfacing. District X, Route 32, Section C. Bates & Rogers Construction Corp., Oakland, \$114,583; J. F. Knapp, Oakland, \$102,488. Contract awarded to C. W. Calletti & Co., San Rafael, \$93,900.50.

MODOC COUNTY—A reinforced concrete slab bridge across North Fork of Pit River in City of Alturas, consisting of 1-45 foot span and 2-15 foot cantilever spans on concrete piles. District II, Route 73, Alturas. Franzini and Fredenburg, San Rafael, \$21,325; Clifford A. Dunn, Klamath Falls, Oregon, \$23,112; Albert H. Siemer and John Carcano, San Anselmo, \$23,749; Campbell Construction Co., Sacramento \$27,541; A. Soda and Son, Oakland, \$27,484; John Rocca, San Rafael, \$30,380. Contract awarded to M. A. Jenkins, Sacramento, \$20,665.00.

MONO COUNTY—Between Sonora Junction and Coleville, 3.5 miles to be graded and surfaced with road-mix surfacing and Class "A" seal coat applied. District IX, Route 23, Section K. Isbell Construction Co., Reno, \$102,984; Basich Brothers, Torrance, \$103,187; George K. Thompson & Co., Los Angeles, \$134,382. Contract awarded to A. S. Vinnell Co., Alhambra, \$75,764.50.

ORANGE COUNTY—Grading and paving with Portland cement concrete, about 0.4 mile between 0.4 mile and 0.8 mile east of Huntington Beach. District VII, Route 60, Section A. Sully Miller Contracting Co., Long Beach, \$15,399; Dimmitt & Taylor, Los Angeles, \$16,312; C. R. Butterfield Kennedy Co., San Pedro, \$17,650; Claude Fisher Co., Los Angeles, \$14,689; Vido Kovacevich, South Gate, \$13,699; J. E. Haddock, Ltd., Pasadena, \$13,460. Contract awarded to Griffith Co., Los Angeles, \$12,682.90.

ORANGE COUNTY—A reinforced concrete girder bridge across Santiago Creek, $\frac{1}{2}$ mile south of Orange, consisting of one 92-foot span and two 49-foot spans on concrete piers and abutments. District VII, Route 181, Section A. Macco Construction Co., Clearwater, \$50,677; L. W. Odell & George J. Bock Co., Los Angeles, \$53,285; C. O. Sparks and Mundo Engineering Co., Los Angeles, \$67,130; Duff and Vandenhooogen Co., Long Beach, \$61,626; Oscar Oberg, Los Angeles, \$58,957; Gibbons and Reed Co., Burbank, \$53,951; R. R. Bishop, Long Beach, \$54,622; Claude Fisher Co., Ltd., Los Angeles, \$60,337; John Strona, Pomona, \$51,868; J. E. Haddock, Ltd., Pasadena, \$51,236; The Contracting Engineers Co., Los Angeles, \$46,594. Contract awarded to Byerts & Dunn, Los Angeles, \$45,723.

RIVERSIDE COUNTY—Reinforced concrete pedestrian underpass, 46th Avenue at Smurr Street, City of Indio. District XI, Route 64. Paul D. Lawrence Co., Los Angeles, \$6,947; M. H. Golden, San Diego, \$4,306; George Herz and Co., San Bernardino, \$4,496. Contract awarded to V. R.

Dennis Construction Co., San Diego, \$4,295.25.

SAN BERNARDINO COUNTY—A reinforced concrete slab bridge across Cucamonga Wash, 2 miles east of Ontario, consisting of five 22-foot spans, two 20-foot spans, and two 5-foot 6-inch cantilever spans on concrete pile bents. District VIII, Route 19, Section B. Paul D. Lawrence Co., Los Angeles, \$16,984; C. T. & W. P. Stover, Claremont, \$17,802; Dimmitt & Taylor, Los Angeles, \$19,451; Claude Fisher Co., Ltd., Los Angeles, \$18,797; Gibbons & Reed Co., Burbank, \$19,903; Byerts & Dunn, Los Angeles, \$17,132; A. L. Gabrielson, Arlington, \$16,406; Carlo Bongiovanni, Beverly Hills, \$19,105; Bennett & Taylor, Los Angeles, \$25,562; John Strona, Pomona, \$18,181; L. W. Odell & Geo. J. Bock Co., Los Angeles, \$20,945; The Contracting Engineers Co., Los Angeles, \$19,846; J. S. Metzger & Son, Los Angeles, \$17,275. Contract awarded to Oberg Bros., Los Angeles, \$15,736.00.

SAN FRANCISCO COUNTY—Reinforced concrete pedestrian subway extension. District IV, Route 55, Section S. F. Chas. L. Harney, San Francisco, \$8,973; L. C. Seidel, Oakland, \$8,872; R. G. Clifford, San Francisco, \$10,365; A. G. Raisch, San Francisco, \$10,438. Contract awarded to Palo Alto Road Materials, Palo Alto, \$8,725.25.

SAN MATEO COUNTY—A reinforced concrete bridge across Coloma Creek in the City of South San Francisco, consisting of one 24-foot span and two 19-foot 6 inch spans and about 0.06 mile of roadway to be graded and surfaced with plant-mixed surfacing and a penetration oil treatment applied to shoulders. District IV, Route 68, South San Francisco. Palo Alto Road Materials Co., Palo Alto, \$20,343; M. B. McGowan, Inc., San Francisco, \$24,263; Albert E. Mangs & Associates, San Francisco, \$25,669; Healy Tibbitts Construction Co., San Francisco, \$26,861; John Rocca, San Rafael, \$27,989. Contract awarded to Franzini & Fredenburg, San Rafael, \$19,646.35.

SAN MATEO COUNTY—Between Skyline Boulevard and La Honda, 1.3 miles to be graded. District IV, Feeder Road. M. J. Ruddy, Modesto, \$54,215; X. Carrithers, San Mateo, \$40,235; Macco Construction Co., Clearwater, \$34,664; Piombo Bros. & Co., San Francisco, \$45,058; Chas. L. Harney, San Francisco, \$53,102; Geo. K. Thompson and Company, Los Angeles, \$53,605; Hemstreet and Bell, Marysville, \$47,210; Mountain Construction Co., Sacramento, \$47,455; Granfield, Farrar and Carlin, San Francisco, \$41,290; Guerin Bros., San Francisco, \$44,559; Eaton and Smith, San Francisco, \$90,290. Contract awarded to N. M. Ball Sons, Berkeley, \$34,212.

SANTA BARBARA COUNTY—Between Guadalupe and Santa Maria, about 6.9 miles to be graded and surfaced with plant-mixed surfacing. District V, Route 148, Section A. J. E. Haddock, Ltd., Pasadena, \$142,813; Oswald Bros., Los Angeles, \$155,625; Granite Construction Co., Ltd., Watsonville, \$162,774; Griffith Company, Los Angeles, \$163,237; Hanrahan Co., Redwood City, \$173,206. Contract awarded to Basich Brothers, Torrance, \$140,423.30.

SANTA BARBARA COUNTY—One mile east of Lompoc, a bridge across Santa Ynez River to be constructed and road-mix surface treatment applied. District V, Route 149, Section B. Bennett & Taylor, Los Angeles, \$95,666; Byerts & Dunn, Los Angeles, \$98,866; Macco Construction Co., Clearwater, \$98,804; R. R. Bishop, Long Beach, \$99,920; J. E. Haddock, Ltd., Pasadena, \$102,036; Gibbons & Reed Co., Burbank, \$107,621. Contract awarded to L. W. Odell and George J. Bock Co., Los Angeles, \$91,010.05.

SHASTA, LASSEN, MODOC COUNTIES—Between Route 3 and Rush Creek, about 33.4 miles, seal coat to be applied at various locations. District II, Route 28. Hayward Building Material Co., Hayward, \$12,576; E. A. Forde, San Anselmo, \$14,046; Lee J. Immel, Berkeley, \$14,970; Acme Transportation, Inc., Oakland, \$15,716; C. F. Fredericksen & Sons, Lower Lake, \$15,596. Contract awarded to Pacific Truck Service, Inc., San Jose, \$11,606.40.

SONOMA COUNTY—Between 1.5 mile southeast of Sebastopol and 3.9 miles southeast of Sebastopol, about 2.4 miles to be graded and surfaced with plant-mixed surfacing. District IV, Route 104, Section C. Lee J. Immel, Berkeley, \$56,725; Hanrahan Co., Redwood City, \$56,900; E. A. Forde, San Anselmo, \$60,836; Union Paving Co., San Francisco, \$62,258; Pacific States Construction Co., San Francisco, \$62,292; Claude C. Wood, Lodi, \$63,754; Harold Smith, St. Helena, \$65,337; Chas. L. Harney, San Francisco, \$72,480; A. Soda and Son, Oakland, \$75,134; Contract awarded to Embleton-Schumacher Co., Albany, \$54,151.91.

SUTTER COUNTY—Between 6.7 and 5.5 miles west of Yuba City about 1.2 miles crusher run base and plant-mixed surfacing borders to be placed. District III, Route 13, Section B. Piazza and Huntley, San Jose, \$7,124. Contract awarded to Hemstreet and Bell, Marysville, \$6,110.50.

VENTURA COUNTY—Between Fillmore and Hopper Creek, 4 miles to be graded and surfaced with asphalt concrete. District VII, Route 79, Section C. A. S. Vinnell Co., Alhambra, \$162,893; Griffith Co., Los Angeles, \$143,090. Contract awarded to Macco Construction Co., Clearwater, \$129,381.

YOLO COUNTY—A reinforced concrete bridge across Cache Creek about $3\frac{1}{2}$ miles northwest of Rumsey to be constructed and about 0.5 mile of approaches to be graded and road-mix surface treatment applied. District III, Route 50, Section A. Campbell Construction Co., Sacramento, \$73,332; C. W. Calletti & Co., San Rafael, \$74,130; Robert McCarthy, San Francisco, \$84,620; Holdener Construction Co., Sacramento, \$95,429. Contract awarded to Hemstreet and Bell, Marysville, \$68,225.25.

Behind Great Boulder Dam

Storage in Lake Mead behind Boulder dam has reached 20,000,000 acre feet, enough to provide 51,100 gallons of water for every man, woman and child in the United States, approximately the average per capita used in a year for domestic purposes. The maximum water elevation is 60 ft. below the crest of the spillways. However 7,189,000 acre feet additional will be required to cause the lake to spill.

A woman traveling by train was talking with the man in the next seat. In describing her holiday, she said that she had visited San Jose.

"You pronounce that wrong," said the man. "It is San Hosay. In California you should pronounce all J's as H's. When were you there?"

The woman thought a minute, then answered, "In Hune and Huly."

STATE OF CALIFORNIA
Department of Public Works

Headquarters: Public Works Building, Twelfth and N Streets, Sacramento

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HARRY A. HOPKINS.....Assistant Director

EARL LEE KELLY.....Director
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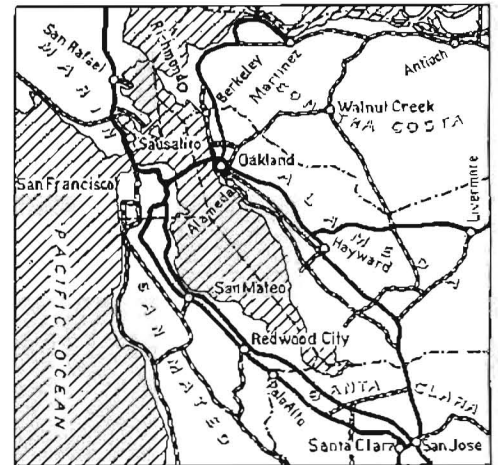
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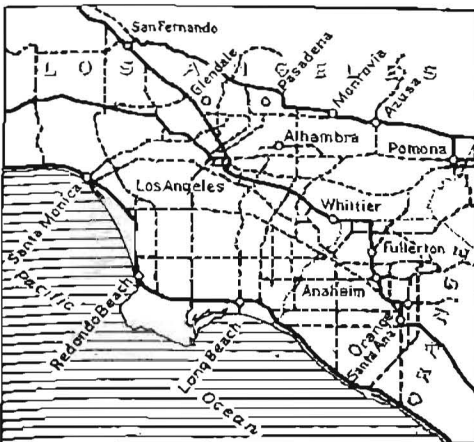
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MAP SHOWING STATE HIGHWAY SYSTEM

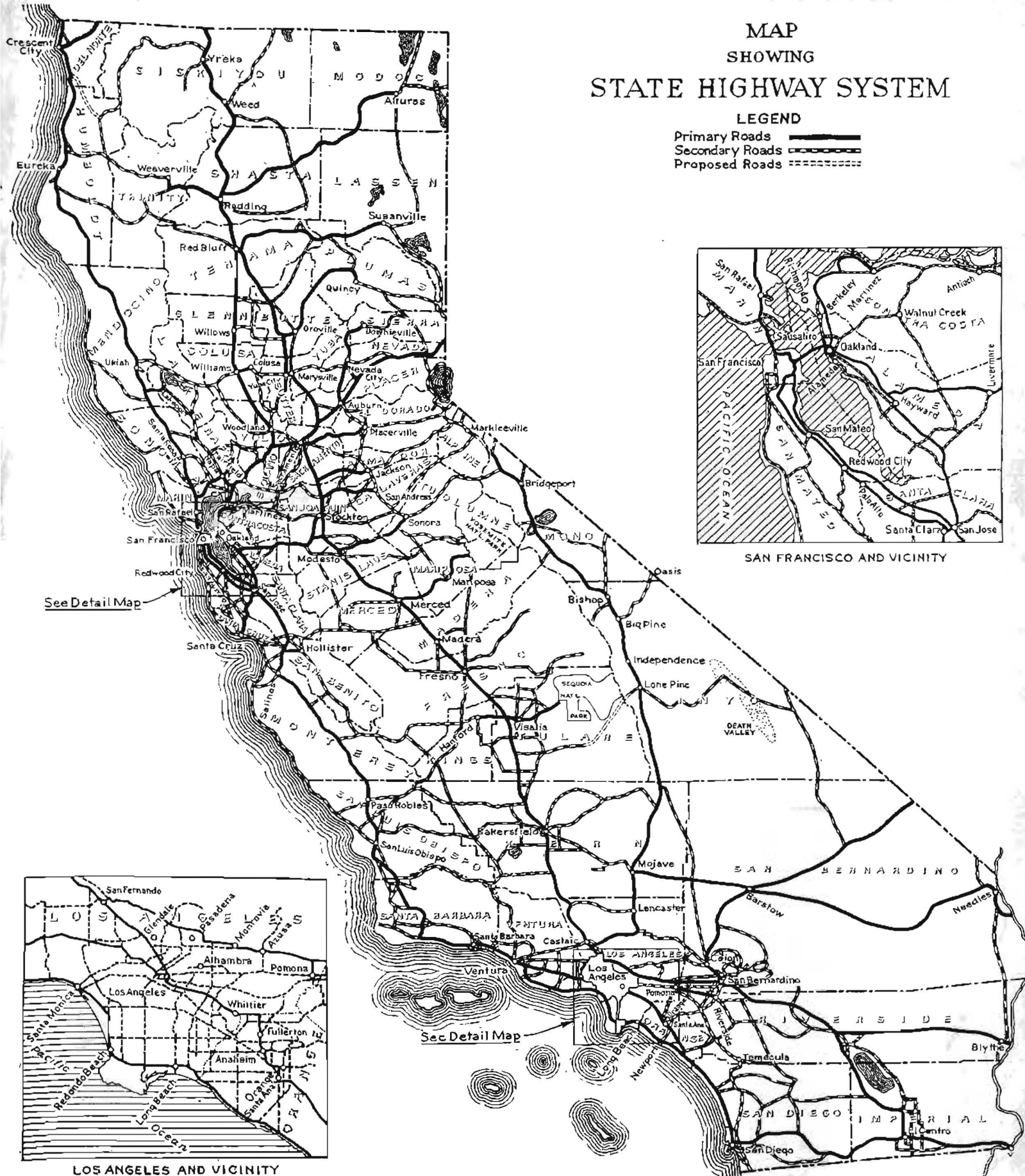
LEGEND
 Primary Roads 
 Secondary Roads 
 Proposed Roads 



SAN FRANCISCO AND VICINITY



LOS ANGELES AND VICINITY



See Detail Map

Sec Detail Map